Appendix D1 Economic Impacts

ESTIMATED ECONOMIC IMPACTS
FOR THE
NORTHWEST ARKANSAS REGIONAL AIRPORT
5-4A and 4-4A ALTERNATIVE ACCESS ROAD CORRIDORS

Prepared by: Phillip Taylor

Fayetteville, Arkansas

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ESTIMATED ECONOMIC IMPACTS
FOR THE
NORTHWEST ARKANSAS REGIONAL AIRPORT
5-4A and 4-4A ALTERNATIVE ACCESS ROAD CORRIDORS

Introduction

There are two possible configurations for Corridor 4A so that there are actually two possible routes for the access road. In this report, the route for Corridor 4A that joins Corridor 4 will be denoted Corridor 4-4A and the one joining Corridor 5 will be labeled Corridor 5-4A.

The economic impact of the construction of a new roadway accrues as a result of a) the land acquisition required for the selected route, b) construction expenditures, c) the diversion of traffic from the existing route and the resulting impact on businesses, and d) utilization of the improved route. The following analysis addresses the economic impacts of land acquisitions, traffic diversion and route utilization separately for each of the proposed routes (Corridors 4-4A and 5-4A) for a new access road to the Northwest Arkansas Regional Airport and where appropriate, there are comparisons of the two alternative routes (Corridors 4-4A and 5-4A) to the continuation of the utilization of the existing access route. Where they have been identified, economic impacts that are not readily quantifiable are also noted. However, economic benefits derived from construction expenditures are not considered in this report. Some of the detailed calculations that support the conclusions of this study, but are not included within the text of this report, are provided in Appendix A.

While there are some variations expected, both within weeks and seasonally, in the volume and mix (business versus leisure) of the users of the

proposed new access road (primarily airport-related traffic), for the purpose of this analysis, the economic impacts are assumed to be uniformly distributed throughout each year. In preparing this report, economic impacts[1] have been computed for a twenty-year time frame (from 2007 through 2027). Within the text of this report, the quantified economic impacts, assuming there is no toll charged for the use of the access road, are presented annually in real (2007) dollars and also in terms of the present value of the impacts using a seven (7) percent rate of discount[2] adjusted to mid-year points. Other information supporting the non-toll economic impact calculations is presented in Appendix A of this report. The report is also supplemented in Appendices B and C with calculations based on the assumption that a toll for using the access road will be charged. A discussion of the sensitivity of some of the economic costs and benefits to changes in the values of certain variables that determine the calculated results is presented in Appendix D.

Land Acquisition Impacts

The economic impact of the land acquisition required for the selected route commences with the actual onset of the project[3] and continues throughout its useful life. This portion of the analysis focuses on the impact of the revenues that will be lost by the taxing units within which properties acquired for the alternative rights-of-way fall.

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[1] It is recognized that some economic impacts are non-quantifiable, at least at this point. To the extent possible, these non-quantifiable impacts will be noted at appropriate places in the report.
[2] Treatment of Value of Life and Injuries in Preparing Economic Evaluations, U.S. Department of Transportation, January 8, 1993
[3] It is likely that non-quantifiable impacts began when the potential routes became known to the public.

The Impacted Areas

The proposed alternative corridors pass through geographic areas that vary in character over their length. The western most portion of the alternative routes is largely agricultural (timber and pasture) in nature and has had limited amounts of capital expenditures for improvements. However, as the alternative routes progress eastward towards I-540 there are more intense amounts of development, including subdivisions currently being developed, along each of the routes.

In determining the following economic impacts, it is assumed that the right-of-way for the access road will be 300 feet in width. It is recognized that either the engineering design of the roadway or cost factors may result in a right-of-way width of 150 feet for some portion, and possibly all, of the access road, but that decision will not be made until some point in the future. Should a decision be made to utilize a more narrow (150 foot) right-of-way, the negative impacts from property acquisition will be diminished, particularly so with respect to the two subdivisions (Legendary and Spring Creek Park) that will be impacted by the two alternative routes.

The area impacted by Corridor 5-4A consists of 208 parcels of land distributed among 173 owners.[4] The length of this proposed corridor is 8.80 miles. The impacted parcels contain 2,185 acres of land, 78 percent of which are noted as forested, with 164 of the parcels containing improvements of some nature[5]. The right-of-way for Corridor 5-4A is estimated to contain approximately 542 acres of land.[6]

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[4] Corridors 4-4A and 5-4A impact four parcels owned by the either the City of Springdale or the Springdale Water and Sewer Department and two owned by the Arkansas Highway and Transportation Department.

[5] For the purposes of this analysis it is assumed that houses have been constructed on the lots in the Legendary and Spring Creek Park subdivisions and that they are owned by individuals at the time the right-of-way is acquired.

[6] The impacted parcels and the proportion of each parcel required for right-of-way purposes was determined by examining a "parcel map" containing an overlay of the right-of-way for the two

Over its 8.65 mile length, Corridor 4-4A impacts 210 parcels of land, distributed among 172 different owners. (The ownership of the parcels impacted by Corridors 4-4A and 5-4A is very similar but not identical.) One hundred sixty five of the parcels are noted as having improvements. There are 2,167 acres of land contained in the parcels impacted by this corridor and 85 percent of the acres are noted as forested. The estimated number of acres in the Corridor 4-4A right-of-way is 538.

A summary of the parcel characteristics of the alternative corridors is presented in Table A-1 in Appendix A of this report.

Assessed Values and Annual Losses in Property Tax Revenue

The property for the corridors is located in Benton County and distributed between four school districts—6, 19, 30 and 50.[7] Some of the parcels of property are also subject to a property tax that supports North West Arkansas Community College. Both alternative Corridors also impact parcels of land that are within the cities of Bentonville, Highfill, Lowell and Springdale.[8] Right-of-way acquisition is expected to take place during 2007. Consequently, the first year of the impact of any tax revenue losses due to the property acquisition will be 2008.

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routes. Except for the area contained within the two referenced subdivisions, the proportion of each parcel required for the right-of-way was judgmentally determined. Moreover, in some instances where only a small portion of a parcel would remain after the needed acreage was acquired the entire parcel was included as part of the right-of-way. It is noted that the acreage required for right-of-way purposes used in the economic impact analysis is greater than that estimated mathematically for purposes of determining the cost of acquiring the necessary property.

[7] District 6 is Bentonville. District 19 is Gentry (Highfill). District 30 is Rogers. District 50 is Springdale.

[8] See Table A-2 in Appendix A for the specific 2005 millage rates for each school district and political unit.

The development of two subdivisions (Legendary and Spring Creek Park) is in their early stages. Thus, it is not possible to know the full extent of home construction that will exist at the time the access road right-of-way is acquired. Therefore, in making the following estimates of lost tax revenues, it was necessary to make assumptions concerning the stage of development of both Legendary and Spring Creek Park subdivisions, as well as the prices of the homes expected to be constructed in those two locations[9]. Specifically, it is assumed that the needed property in the two subdivisions will have been fully developed with homes constructed and sold[10] by the point in time at which the right-of-way is acquired. This assumption acts to maximize right-of-way costs and consequently, minimize the quantified net economic impacts of the two alternative corridors.

There are 208 parcels of property impacted by Corridor 5-4A with an appraised value of $43.03 million and the estimated right-of-way acreage for this corridor has an effective assessed value of approximately $6,709,000. The selection of Corridor 5-4A will result in an aggregate annual loss in tax revenues of $352,927. The annual loss to School District 6 will be $2,313 (0.66% of the total); for District 19 the loss will be approximately $31 (a 0.01% share); District 30 will lose $11,380 (3.22% of the total); and School District 50--$259,168, or 73.43% of the total lost tax revenue. With the selection of this corridor, the City

[9] Information concerning the development of the two subdivisions was acquired through interviews with the developers. The developers of Spring Creek Park were interviewed on July 18, 2006. The Legendary subdivision developer was interviewed on July 21, 2006.

[10] The developer of Legendary subdivision has reserved nine acres to accommodate a 150 foot access road right-of-way and values that land at $50,000 per acre. With a 300 foot right-of-way, in addition to the nine-acre set aside it will be necessary to acquire 25 lots it is anticipated will be priced at $65,000 to $75,000 each and 9 lots with an estimated price range of $90,000 to $100,000. Homes constructed on the lower priced lots are expected to be priced at or near $400,000 (including lots) and the nine on the more expensive lots will be at or near $600,000. With the passage of the access road through Spring Creek Park, several lots will be isolated with no access. Moreover, given the necessity to reconfigure streets within the subdivision following the loss of property to the right-of-way, additional lots will be lost beyond those actually included within the right-of-way. Consequently, it is estimated passage through this subdivision will require the acquisition of 66 lots. The developer of Spring Creek Park estimated lot prices as $45,000 and that the price of homes would be approximately $225,000.

of Lowell will lose $1,212 in tax revenue, or 0.34% of the total loss. The annual tax revenue lost to Bentonville will be $96 (about 0.03% of the total loss). For Highfill, the lost revenue amounts to 0.01% of the total, or $27 per year. North West Arkansas Community College's share of the loss will be 0.25%, with a loss in tax revenue of $898. Benton County's estimated annual tax revenue loss will be $41,645, or 11.80% of the tax revenue impact for this corridor.

TABLE 1
ANNUAL TAX REVENUES LOST BY GOVERNMENTAL UNITS
2009 - 2027

Governmental Units	Corridor 5-4A	Corridor 4-4A
School District		
6	$2,313	$1,721
19	31	1
30	11,380	11,380
50	259,168	250,177
Total School Districts	$272,892	$263,279
City		
Bentonville	$96	$96
Highfill	27	19
Lowell	1,212	1,212
Springdale	36,156	34,857
Total Cities	$37,491	$36,184
North West Arkansas Community College	$898	$861
Benton County	$41,645	$40,181
Grand Total	$352,927	$340,505

The 210 parcels impacted by Corridor 4-4A have an appraised value of $43.05 million and the acreage estimated to be required for the right-of-way has an approximate effective assessed value of $6,697,000. The annual total loss in tax revenues for Corridor 4-4A will be $340,505. The losses to schools will be as follows: District 6--$1,721, District 19--$1, District 30--$11,380, and District 50--$250,177. Relative to the to annual total, the loss for District 6 is 0.51%, for District 19 it is less than 0.01%, the loss for District 30 is 3.34% and for District 50—73.47%. Benton County will lose 11.80% of the total with a loss in annual revenue of $40,181. The $861 loss in tax revenue to North West Arkansas Community College is 0.25% of the total loss in tax revenue. With the selection of this corridor, the City of Lowell will lose $1,212 in annual tax revenue, or 0.36% of the total loss. The tax revenue lost to Bentonville will be $96 (approximately 0.03% of the total loss). For Highfill, the lost revenue amounts to 0.01% of the total, or $19 per year. Springdale's lost revenue is $34,857, or 10.24% of the total for this alternative corridor.

As noted earlier, the above computations were made with the assumption that the needed portions of both the Legendary and Spring Creek Park subdivisions are fully developed at the time the right-of-way is acquired. The estimated appraised value of the impacted parcels in the two subdivisions is $30.4 million and the effective assessed value is approximately $6.08 million. The lost tax revenue attributable to this property is $309,863, or 88% of the calculated total for Corridor 5-4A and 91% for that of 4-4A. For the Springdale School District (District 5), the loss attributable to the two subdivisions is $239, 000, and for the City of Springdale, nearly $35,000. For Corridor 5-4A, these losses amount to 92% and 96% of the totals for the school district and the city, respectively. With respect to Corridor 4-4A, the quantities are 95% and 99%, respectively.

TABLE 2
PERCENT OF LOST TAX REVENUES BY GOVERNMENTAL UNITS
2008 - 2027

Governmental Units	Corridor 4A-5	Corridor 4A-4
School District		
6	0.66%	0.51%
19	0.01%	0.00%
30	3.22%	3.34%
50	73.43%	73.47%
Total School Districts	77.32%	77.32%
City		
Bentonville	0.03%	0.03%
Highfill	0.01%	0.01%
Lowell	0.34%	0.36%
Springdale	10.24%	10.24%
Total Cities	10.62%	10.63%
North West Arkansas Community College	0.25%	0.25%
Benton County	11.80%	11.80%
Grand Total	100.00%	100.00%

Tax Revenue Losses Through the Year 2027

In the planning for this project, it is assumed that the right-of-way acquisition will begin in January 2007 and be complete by the end of December of that same year. Consequently the losses to the governmental taxing units will begin in 2008. For purposes of determining the present value of the losses, they have been discounted to the middle of 2007 using a 7% rate of interest.

With the selection of Corridor 5-4A the total loss through 2027 will be $6,882,074. The 2007 present value of the total loss is $3,455,110. The present value of this loss broken down by taxing unit is as follows: Benton County - $407,703; School District 6 - $22,639; School District 19 – $307; School District 30 -- $111,408; School District 50 -- $2,537,224; and North West Arkansas Community College - $8,794. For the impacted cities the present values of the losses are as follows: Bentonville -- $969; Highfill -- $268; Lowell -- $11,862, and Springdale -- $353,966.

The total loss through 2027 if Corridor 4-4A is selected will be $6,639,842, and this amount has a 2007 present value of $3,333,499. The present value of this loss broken down by taxing unit is as follows: Benton County - $393,869; School District 6 - $16,852; School District 19 – $11; School District 30 -- $111,408; School District 50 - $2,449,197; and North West Arkansas Community College - $8,426. For the impacted cities the present values of the losses are as follows: Bentonville -- $939; Highfill -- $187; Lowell -- $11,862 and Springdale -- $341,249.

TABLE 3
TOTAL TAX REVENUES LOST BY GOVERNMENTAL UNITS
2008 - 2027

Governmental Units	Nominal Value		Present Value	
	5-4A	4-4A	5-4A	4-4A
School District				
6	$45,094	$33,567	$22,639	$16,852
19	611	21	307	11
30	221,908	221,908	111,408	111,408
50	5,053,780	4,878,442	2,537,224	2,449,197
Total School Districts	$5,321,392	$5,133,938	$2,671,578	$2,577,467
City				
Bentonville	$1,870	$1,870	$939	$939
Highfill	533	373	268	187
Lowell	23,628	23,628	11,862	11,862
Springdale	705,048	679,718	353,966	341,249
Total Cities	$731,079	$705,589	$367,034	$354,237
North West Arkansas Community College	$17,517	$16,783	$8,794	$8,426
Benton County	$812,086	$783,533	$407,703	$393,369
Grand Total	$6,882,074	$6,639,842	$3,455,110	$3,333,499

While the lost tax revenues stemming from the acquisition of houses are included in the preceding calculations, as a result of the rate of growth in the area's population it is reasonable to assume that the housing inventory will be restocked via new construction that may, in fact, produce greater tax revenues than the units being displaced. However there may be some redistribution of tax

revenues among taxing units given the abundance and geographic diversity of locations available for the construction of replacement housing. Consequently, no positive offset for the lost tax revenues flowing from the reduction of the housing stock has been incorporated in this analysis.

It also seems reasonable to believe that, given the growth and prosperity of Northwest Arkansas, if businesses are dislocated in the areas where the alternative corridors would intersect I-540 they may continue to operate from a different location. Similarly, the economic impact of the dislocation of poultry, cattle and dairy operations as a result of the construction of the airport access road is likely to be at least partially mitigated via the creation of similar agricultural operations elsewhere in the region. Just as with the housing stock, however, it is not possible to determine in advance what relocations will actually occur and where those relocations will be. Thus, no offsetting adjustments for the possible business and agricultural facility relocations have been included in the calculations of lost tax revenues.

Utilization of the Proposed Access Road

For those traveling from points south, southeast, southwest and east of Northwest Arkansas Regional Airport current access to the airport and areas to its west is via Arkansas Highway 112 (from the south and southwest) and I-540 and Arkansas Highway 264 (from the south, southeast, and east). The two highways intersect in Cave Springs and from that point traffic moves along Arkansas Highway 264 to the airport entrance.

A substantial majority of the population of the area (Benton and Washington Counties) is located east of the airport. Given the geographic distribution of the population and the existence of I-540 as a north-south corridor serving the centers of population in the region, it seems reasonable to believe

that the preponderance of the traffic diversion attributable to a new airport access road will be that traffic currently traveling SH 264.

For purposes of the calculations contained in this report, it is assumed that the majority of the vehicle traffic utilizing the proposed new access road would have, in the absence of the proposed new route, traveled along Arkansas Highway 264 between its intersection with I-540 and the Northwest Arkansas Regional Airport (XNA). Smaller portions of the traffic utilizing the proposed new route will 1) have origins and destinations west of the entrance drive to XNA and 2) be diverted from traveling on Arkansas Highway 112.

TABLE 4
PROJECTED DAILY TRAFFIC VOLUMES
CORRIDORS 5-4A and 4-4A
NON-TOLL OPTION

Year	Average Daily Traffic	Year	Average Daily Traffic
2010	8,250	2019	13,020
2011	8,780	2020	13,550
2012	9,310	2021	14,080
2013	9,840	2022	14,610
2014	10,370	2023	15,140
2015	10,900	2024	15,670
2016	11,430	2025	16,200
2017	11,960	2026	16,730
2018	12,490	2027	17,260

Source: CH2MHill

For purposes of this report, Corridors 5-4A and 4-4A are assumed to have identical traffic volumes. Annual average daily traffic (AADT) projections based

on toll and non-toll conditions for the alternative routes for each year from 2010 through 2027, inclusive, have been prepared by CH2MHill. The non-toll projections are displayed in Table 4 and these (non-toll) projections are the basis for the economic impacts presented in the text of this study. For reference purposes, the economic impacts assuming the access road is tolled have been calculated and are provided in Appendices B and C.

In the following sections, the traffic volumes in Table 4 are utilized in estimating the positive and negative annual economic impacts of the two access road corridors. In calculating the traffic volumes, it was assumed that the principal origins of traffic moving westward on the access road with a destination of XNA or west of the XNA entrance will be areas to the south of the point where the access road intersects I-540.[11] Similarly, traffic moving eastward on the access road will originate at either XNA or west of the XNA entrance.

Impact on Businesses by Traffic Diversion

Arkansas Highway 112 passes through the municipality of Elm Springs on its route from Tontitown to Cave Springs. The point where Arkansas Highway 264 intersects I-540 is within the western limits of the City of Lowell. These are the only three municipalities (Cave Springs, Elm Springs and Lowell) containing commercial establishments that may be impacted by the diversion of traffic resulting from the construction of the access road.[12]

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[11] On page A.20 of the Northwest Arkansas Regional Airport Access Road DEIS, CH2MHill and Barnard Dunkelberg and Associates estimate that 55% of the airport generated traffic exits the airport utilizing SH 264. In their Traveler Demographics, 2004 Customer Satisfaction Survey, Northwest Arkansas Regional Airport, Terrapin Consulting LLC found that 50.4% of a sample of 924 airline passengers began their trip to the airport at a point somewhere other than north of XNA.

[12] It is possible that there will be some impact on businesses located at or near the intersection of US 412 and SH 112 but it is thought that any such impact will be small.

In 2000, Cave Springs had a population of 1,103 and Elm Springs had a population of 1,044.[13] With their small population bases and close proximity with much larger urban areas, neither community has a large number of commercial establishments. Lowell has a rapidly expanding economy but its commercial enterprises are primarily located along US 71B east of I-540.

Inspection of the three cities identified five retail establishments in Cave Springs that might be impacted by the diversion of traffic to the proposed new access road. The list included two convenience stores, a tire service business, a restaurant, and a hardware store. Interviews with the management of each business determined that only two believed they received a noteworthy amount of business from traffic related to the airport. The number of businesses in Elm Springs identified as being potentially impacted by the traffic diversion was also two: a convenience store and a café. There are two businesses located east of the I-540/Arkansas Highway 264 interchange in Lowell that appear to have the potential to be impacted but interviews with the owners of the two firms, a fast-food establishment and a motel, resulted in the conclusion that any impact would be both minimal and insignificant. A survey of Arkansas Highway 264 found no retail outlets or businesses of other types outside the corporate limits of Cave Springs and Lowell that would be impacted by the diversion in traffic.[14] Similarly, no retail outlets or businesses of other types were found along SH 112 outside of Elm Springs (between Cave Springs and Tontitown) that one could reasonably expect to be impacted.

Corridors 5-4A and 4-4A converge at a point west of Arkansas Highway 112 and then follow the same alignment to the intersection point with I-540. There appear to be no factors that would cause the impact of one corridor on existing businesses in Cave Springs and Elm Springs to differ from another. Consequently, the diversion of traffic from existing retail businesses in Cave

[13] 2000 Census of Population, Arkansas, Bureau of the Census, US Department of Commerce
[14] There is one retail outlet along Highway 264 but it is a general merchandise store and it is believed that the number of customers it might derive from airport related traffic is minimal.

Springs and Elm Springs by the construction of the proposed access road will not differ between the alternative corridors.

The original survey of business establishments in the Elm Springs and Cave Springs communities took place in 2003. The business managers were asked to provide an estimate of the volume of their business that was derived from airport passenger related traffic in 2002.[15] The firms in Cave Springs estimated weekly sales to airport passenger related traffic to be $275 per week, while those in Elm Springs placed their estimate at $440 per week. This was equivalent to approximately 6.3 cents per vehicle. Since that point in time, prices have changed (and will likely continue to change in 2007) so that the 2002 data requires updating to estimated 2007 dollars.[16] After the adjustment for estimated price changes, the sales loss per vehicle will be approximately 7.4 cents per diverted vehicle. In estimating the impacts for future years, the projected growth in traffic for each of the alternative corridors has been utilized.

As reflected in Table 5, the total lost sales impact over the 2010 to 2027 time frame will be $6,190,000 with a present value of $2,705,000. However, the actual economic impact of the lost sales for a business is measured by lost marginal profit. Since all but one of the potentially impacted businesses is a convenience store selling gasoline, it seems reasonable to use an estimate of the gross profit for stores of that type to determine the marginal profit on the lost sales of the impacted businesses.

The estimated gross profit percentage of convenience stores selling gasoline with sales of $1 million or less in 2004 was 22.4%.[17] Using that

[15] Table A-3 in Appendix A of this report contains the 2002 estimated airport travel-related sales.
[16] As reflected by the November 2006 Consumer Price Index for All Items for cities in the South with less than 50,000 in population, consumer prices increased approximately 2.3% per year between 1996 and 2005. The average price level for the first 11 months of 2006 was incremented by that amount in estimating prices in 2007. This results in a 17.5% increase in the 2002 numbers.
[17] Financial Ratio Benchmarks, 2004-2005, RMA Annual Statement Studies, RMA, Philadelphia, Pennsylvania, 2004, p. 953.

percentage, the economic impact per diverted vehicle is approximately $0.0165. For the study period, the quantified impact on businesses if either Corridor 5-4A or 4-4A is selected is calculated to be a loss in gross profits of $1,387,000, with a 2007 present value of $606,000. It should be noted that the marginal gross profit impact numbers are pre-tax. Thus, the actual loss to business owners would be somewhat less.

TABLE 5
DIVERTED SALES AND GROSS PROFIT ON THOSE SALES
BUSINESSES IN CAVE SPRINGS, ELM SPRINGS AND LOWELL
CORRIDORS 5-4A and 4-4A
2007 dollars

	Sales		Gross Profit	
Year	Nominal Dollars	Present Value	Nominal Dollars	Present Value
2010	$222,433	$175,532	$49,825	$39,319
2011	236,723	174,587	53,026	39,108
2012	251,012	173,015	56,227	38,755
2013	265,302	170,902	59,428	38,282
2014	279,592	168,324	62,629	37,705
2015	293,881	165,352	65,829	37,039
2016	308,171	162,049	69,030	36,299
2017	322,461	158,470	72,231	35,497
2018	336,750	154,666	75,432	34,645
2019	351,040	150,681	78,633	33,753
2020	365,329	146,556	81,834	32,829
2021	379,619	142,326	85,035	31,881
2022	393,909	138,022	88,236	30,917
2023	408,198	133,672	91,436	29,942
2024	422,488	129,300	94,637	28,963
2025	436,778	124,928	97,838	27,984
2026	451,067	120,575	101,039	27,009
2027	465,357	116,257	104,240	26,042
Totals	$6,190,110	$2,705,213	$1,386,585	$605,968

While it is not currently part of an operating business, a large deposit of limestone is within the right-of-way for Corridors 5-4A and 4-4A. The full extent of the value of this limestone deposit to the local economy if it was an operating business may not be accurately reflected in the right-of-way acquisition costs.

Benefits Derived from the Utilization of a New Route

Economic benefits derived from diverting traffic to one of the proposed corridors stem from a) the willingness of individual travelers to pay to reduce the risk of accidental death and injury they face in using the transportation system, b) the money value of time saved, and c) savings in the operating costs of vehicles. The results of the calculations estimating the economic benefits stemming from these three sources, and the basis for the calculations, are presented in the following sections.

Reductions in Highway Crashes and Their Associated Costs

From the point that alternative Corridors 5-4A and 4-4A would intersect I-540, the travel distance to the Northwest Arkansas Regional Airport is approximately 10.9 miles, with 1.4 miles of that on I-540 and 9.5 miles on the rural two-lane SH 264. The length of alternative Corridor 4-4A is 8.65 miles, while that of 5-4A is 8.80 miles.[18] Thus, optional Corridor 5-4A would provide a reduction in travel distance of 2.10 miles and for Corridor 4-4A the reduction would be 2.25 miles.

Given the projected traffic volumes, for Corridor 5-4A the projected number of miles traveled in 2010 is 26,499,000 and for Corridor 4-4A, the number is 26,047,313. Through 2027, the reduction in miles traveled for Corridor 5-4A is 176 million and for Corridor 4-4A the reduction is 189 million.[19]

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[18] CH2MHill

[19] See Table A-4 in Appendix A for miles traveled and saved annually.

The numbers of accidents for each alternative corridor were developed using the accident rates for the year 2000.[20] The rate applied for the alternative corridors was 0.58 crashes per million miles traveled. The same rate (0.58 crashes per million miles traveled) was applied to the I-540 portion of the current route to the Northwest Arkansas Regional Airport and a crash rate of 1.34 per million miles traveled was utilized for the SH 264 portion of that route. Those were the prevailing crash rates in Arkansas in the year 2000 for rural, controlled access and rural, two-lane roads, respectively.[21] (It should be noted that the accident rate on SH 264 is substantially higher[22] than the average for a road of this type in Arkansas and thus the accident rate for the current route may be substantially understated in this analysis.)

The accident severity distribution for the SH 264 portion of the current route (fatal, incapacitating injury, evident injury, possible injury and property damage only) is based on the SH 264 average experience for the period 2001 to 2003. For each alternative corridor and the I-540 portions of the current route, the average 2001 to 2003 accident severity distribution of I-540 between approximately the Benton County line and its intersection with SH 264 was used.

The calculated economic impact of an accident is based on the willingness of individual travelers to pay to reduce the risk of accidental death, injury and/or property damage they face in using the transportation system. At the current time, U.S. Department of Transportation Guidelines[23] places the following monetary values on the benefits individuals perceive their derive from avoiding these risks: $3.0 million as the benefit of averting an accidental fatality; avoiding

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[20] The numbers of accidents projected for each alternative corridor are presented in Tables A-5 through A-8 in Appendix A.
[21] Arkansas Highway and Transportation Department.
[22] See Northwest Arkansas Regional Airport Intermodal Access Road Draft Environmental Impact Statement, CH2MHill and Barnard Dunkelberg & Company, page A-11.
[23] Revised Departmental Guidance, Treatment of Value of Life and Injuries in Preparing Economic Evaluations, U.S. Department of Transportation, January 29, 2002.

incapacitating injury-$180,000; averting evident injury-$36,000; avoiding possible Injury-$19,000; and avoiding property damage-$2,000.[24]

TABLE 6
EXPECTED VALUE OF WILLINGNESS TO PAY TO AVOID LOSS
ARKANSAS HIGHWAY 264
LOWELL EXIT TO XNA ENTRANCE
2001-2003 CRASH DATA

Severity	Number	Probability	Number of Deaths	Number of Injuries	Willingness to Pay	Expected Cost
1	2	0.009	2		$3,000,000	$27,397
2	16	0.073		26	$180,000	$21,370
3	22	0.100		36	$36,000	$5,918
4	51	0.233		117	$19,000	$10,151
5	128	0.584			$2,000	$1,169
Total	219	1.000				$66,005

Given the Arkansas State Police crash records, it is possible to construct a probability distribution for crash severity and to apply that distribution to the amounts individuals are willing to pay to reduce risks. The result is the expected value of risk reduction for a highway crash. Those values are presented for crashes on SH 264 and the relevant portion of I-540 in Tables 6 and 7.

[24] Arkansas State Police rate accidents on a scale of 1 to 5, with 1 being the most severe (a fatality). In estimating the costs associated with accidents it is assumed that the Arkansas State Police scale is equivalent to the five point K-B-B-C Scale as published in MOTOR VEHICLE ACCIDENT COSTS, T 7570.2, Technical Advisory, US Department of Transportation, Federal Highway Administration, October 31, 1994. See Table A-7 in Appendix A.

TABLE 7
EXPECTED VALUE OF WILLINGNESS TO PAY TO AVOID LOSS
INTERSTATE 540
BENTON COUNTY LINE TO LOWELL EXIT
2001-2003 CRASH DATA

Severity	Number	Probability	Number of Deaths	Number of Injuries	Willingness to Pay	Expected Value
1	1	0.007	1		$3,000,000	$ 20,270
2	4	0.027		4	$180,000	4,865
3	21	0.142		41	$36,000	9,973
4	40	0.270		78	$19,000	10,014
5	82	0.554			$2,000	1,108
Totals	148	1.000				$ 46,230

Each of the alternative corridors requires traversing fewer miles than does the present route and thus, all other factors remaining constant, fewer miles traveled infers fewer accidents. Economic benefits also accrue because the frequency of accidents per million miles traveled is less on a controlled-access highway than it is on one without controlled access. Upon computing the expected values of risk reduction for a highway crash, it is also significant that the expected value for I-540 (a rural, controlled-access highway) is less than that of SH 264 (a rural two-lane highway). Thus, economic benefits will be derived by rerouting traffic from SH 264 to the proposed controlled access road for the Northwest Arkansas Regional Airport because of 1) a reduction in miles traveled, 2) fewer accidents as a result of diverting traffic from a two-land highway to a controlled-access one, and 3) lower expected values associated with the risk of crashes on a controlled access road as compared to a two-lane highway.

In order to estimate the economic benefits derived from the reduction in crashes associated with each of the alternative corridors being evaluated, the values individual travelers are willing to pay to reduce the risk of accidental death, injury and/or property damage they face in using the transportation system have been applied to the expected numbers of crashes of each type estimated for each corridor. The estimated numbers of crashes and their outcomes are presented in Tables A-5 and A-6 in Appendix A. The values individuals are willing to pay to avoid those losses are provided in Tables A-8 and A-9 in Appendix A.

Over the period from 2010 and 2027, it is estimated that the construction of Corridor 5-4A will result in a decline of 707 in the number of crashes and the result for Corridor 4-4A will be a 714 reduction in the number of crashes.

The accident-related economic benefits derived from the alternative corridors are summarized in Table 8. As previously noted, the benefits accrue from 1) a reduction in miles traveled, 2) a reduction in the frequency of accidents and 3) a reduction in average severity of crashes. Over the total period from 2010 through 2027 Corridor 5-4A has a total crash-related benefit of $53.8 million and the total for Corridor 4-4A is $54.1 million.

For the Corridor 5-4A alternative, the present value of the total is $23.5 million, while the number for Corridor 4-4A is $23.7 million.[25]

[25] The sensitivity of the present value calculations to changes in traffic volumes is discussed in Appendix D.

TABLE 8
SUMMARY
TRAVELERS' WILLINGNESS TO PAY TO REDUCE CRASH LOSSES
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Cost Reduction	Present Value of Cost Reduction	Cost Reduction	Present Value of Cost Reduction
2010	$1,932,681	$1,525,165	$1,944,792	$1,534,723
2011	2,056,841	1,516,959	2,069,730	1,526,465
2012	2,181,001	1,503,298	2,194,668	1,512,719
2013	2,305,161	1,484,933	2,319,607	1,494,238
2014	2,429,321	1,462,536	2,444,545	1,471,701
2015	2,553,481	1,436,715	2,569,483	1,445,718
2016	2,677,641	1,408,013	2,694,421	1,416,836
2017	2,801,802	1,376,917	2,819,359	1,385,545
2018	2,925,962	1,343,864	2,944,297	1,352,285
2019	3,050,122	1,309,242	3,069,235	1,317,447
2020	3,174,282	1,273,399	3,194,174	1,281,379
2021	3,298,442	1,236,642	3,319,112	1,244,392
2022	3,422,602	1,199,245	3,444,050	1,206,760
2023	3,546,762	1,161,448	3,568,988	1,168,726
2024	3,670,922	1,123,464	3,693,926	1,130,504
2025	3,795,082	1,085,479	3,818,864	1,092,281
2026	3,919,243	1,047,655	3,943,803	1,054,221
2027	4,043,403	1,010,135	4,068,741	1,016,465
Totals	$53,784,751	$23,505,108	$54,121,795	$23,652,403

Reductions in Vehicle Travel Time

The initial measures of the travel times utilized in this study were originally done for alternative Corridors 4 and 5. In order to determine the time required to travel Arkansas Highway 264 between the approximate points where Corridors 4 and 5 would intersect I-540 and the approximate airport entrance, the route was traversed 49 times under varying conditions. The sample frame includes measures at points in time ranging from the early morning to late evening on both weekdays and weekends and included both fair weather and rainy conditions. The sample mean travel time from the Corridor 4 intersection point with I-540 was 16.58 minutes; the median time was 16.01 minutes; the minimum time was 15.04 minutes; the maximum time was 28.82 minutes; and the standard deviation[26] of the times was 2.20 minutes. As would be expected, the distribution of travel times is somewhat asymmetrical with positive skewness. With respect to Corridor 5, the sample of 49 times produced a mean of 17.54 minutes; a median of 16.86 minutes; a minimum of 16.07 minutes; a maximum of 29.36 minutes; and a standard deviation of travel times of 2.13 minutes.[27] As with the Corridor 4 alternative, the travel times from the point where Corridor 5 intersects I-540 and the airport entrance are asymmetrical with positive skewness. Given the preceding information and using a 95% confidence interval estimate, from the point of juncture of the Corridor 4 alternative with I-540 the mean travel time to the airport using the present route is between 15.99 minutes and 17.17 minutes, and that for the intersection of Corridor 5 with I-540 falls within the interval of 16.97 and 18.10 minutes.

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[26] The calculated standard deviation is the unbiased estimator of the population standard deviation.

[27] Following the original observations of travel times, two traffic signals were installed at the interchange of SH 264 and I-540. These signals impact the travel times of vehicles traveling to the airport but do not impact those returning from the airport. Based on 17 observations, the impact on travel times for airport-bound traffic is an increase of approximately 1.5 minutes. Thus, the travel times previously determined have been incremented by 1.5 minutes to reflect that increase.

TABLE 9
TRAVEL TIMES
(minutes)

Corridor	Current Route			Proposed Route
	Mean	Lower Estimate	Upper Estimate	Estimated Time
5	17.54	16.97	18.10	6.88
4	16.58	15.99	17.17	6.85
5-4A	15.27	14.74	15.80	8.12
4-4A	15.27	14.74	15.80	7.98

The travel time to Northwest Arkansas Regional Airport from the point where Corridors 5-4A and 4-4A insect I-540 was estimated by determining the required travel time from the intersection point to SH 264 and then adding that time to the previously determined times for traveling from the I-540/SH 264 interchange to the airport. The measurements were taken 34 times. The resulting mean travel time was 15.27 minutes. The variances of the times for the two segments were then pooled.[28] Utilizing a 95% confidence interval, the mean time required to travel to the airport from the approximate point where Corridor 4A intersects I-540, using the current route, is between 14.74 minutes and 15.80 minutes.

For the two alternative corridors, the estimated travel times from the airport entrance to I-540 are as follows: Corridor 5-4A—8.12 minutes and for Corridor 4-4A—7.98 minutes.[29] By subtracting these times from the sample times

[28] For a reference on pooling methodology and determining an appropriate t statistic, see Wayne Daniel and James Terrell, BUSINESS STATISTICS, Houghton Mifflin Company, seventh edition, pp. 280-284

[29] These times assume an average travel speed of 65 miles per hour.

determined for the present route, it is possible to estimate the travel time that will be saved for each of the alternative corridors. Corridor 5-4A has a mean time-savings of 7.15 minutes, with a minimum estimate of 6.62 minutes and a maximum of 7.68 minutes. With respect to Corridor 4-4A, the estimated mean savings is 7.29 minutes, the minimum estimate of the mean is 6.76 minutes and the maximum estimate is 7.82 minutes. It should be noted that with the continued development of subdivisions along Highway 264 travel density will increase, and consequently, the expected travel time to XNA will grow as well.

Given its projected daily traffic volumes (AADT) between 2010 and 2027, the current route for Corridor 5-4A is projected to require 21.3 million vehicle hours of travel over the relevant time period and this will decline to 11.3 million vehicle hours with the proposed route. The saved time, therefore, is 10.0 million vehicle hours. The minimum and maximum saved times are 9.2 and 10.7 million vehicle hours, respectively, with 95% confidence.

For Corridor 4-4A, the current route and projected volume of traffic will also entail 21.3 million vehicle hours of travel, with the proposed route requiring vehicle travel hours of 11.1 million. The saved time for Corridor 4-4A is 10.2 million vehicle travel hours. Using a 95% confidence level, the minimum saved time will be 9.4 million vehicle hours while the maximum will be 10.9 million vehicle hours.

TABLE 10
ESTIMATED TOTAL TRAVEL TIMES
(vehicle hours)
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Present Route	Proposed Route	Present Route	Proposed Route
2010	766,363	407,523	766,363	400,496
2011	815,596	433,703	815,596	426,225
2012	864,829	459,883	864,829	451,954
2013	914,062	486,063	914,062	477,683
2014	963,295	512,243	963,295	503,412
2015	1,012,528	538,424	1,012,528	529,141
2016	1,061,761	564,604	1,061,761	554,869
2017	1,110,994	590,784	1,110,994	580,598
2018	1,160,227	616,964	1,160,227	606,327
2019	1,209,460	643,145	1,209,460	632,056
2020	1,258,693	669,325	1,258,693	657,785
2021	1,307,926	695,505	1,307,926	683,514
2022	1,357,159	721,685	1,357,159	709,242
2023	1,406,392	747,866	1,406,392	734,971
2024	1,455,625	774,046	1,455,625	760,700
2025	1,504,859	800,226	1,504,859	786,429
2026	1,554,092	826,406	1,554,092	812,158
2027	1,603,325	852,586	1,603,325	837,887
Totals	21,327,189	11,340,981	21,327,189	11,145,447

TABLE 11
ESTIMATES OF TOTAL TRAVEL TIMES
ALTERNATIVE CORRIDOR INTERSECTION WITH I-540
TO XNA VIA PRESENT ROUTE
(vehicle hours)
NON-TOLL OPITON

Year	Lower Estimate	Upper Estimate
2010	739,764	792,963
2011	787,288	843,904
2012	834,812	894,846
2013	882,336	945,788
2014	929,861	996,730
2015	977,385	1,047,672
2016	1,024,909	1,098,614
2017	1,072,433	1,149,555
2018	1,119,957	1,200,497
2019	1,167,482	1,251,439
2020	1,215,006	1,302,381
2021	1,262,530	1,353,323
2022	1,310,054	1,404,265
2023	1,357,579	1,455,206
2024	1,405,103	1,506,148
2025	1,452,627	1,557,090
2026	1,500,151	1,608,032
2027	1,547,675	1,658,974
Totals	20,586,953	22,067,426

Reductions in Person Hours of Travel Time

For purposes of estimating the number of person hours of travel time that will be saved as a result of the construction of a new access road to the Northwest Arkansas Regional Airport, it is necessary to make two assumptions.

1) It is assumed that 12% of the traffic consists of trucks (this is consistent with assumptions elsewhere in this impact study).

2) Vehicles arriving at the airport contain various numbers of individuals. Observations of 114 arriving vehicles determined they contained 212 people, or a mean of 1.86 per vehicle. Thus, for the purpose of calculating the person hours of saved travel time, it is assumed that each automobile utilizing the proposed access road contains 1.86 individuals.

Utilizing assumptions 1) and 2) above, Table 12 contains the estimated total amount of travel time (person hours) saved for individuals traveling in automobiles and trucks for each corridor for each year of the study period. The estimated time saved is determined, in the case of automobiles, by taking the difference in the times required to travel the existing and proposed routes, multiplying that difference by 0.88 to determine the amount to be allocated to automobiles, and then multiplying that result by 1.86 to take into consideration the mean number of passengers per automobile and then multiplying by the annual traffic volume. For trucks, it is assumed that there is only one occupant of each vehicle so that the saved travel time is calculated by taking the difference between the travel times of the proposed and existing routes and multiplying that number by 0.12 (the assumed proportion of traffic that is trucks) and then multiplying the difference by the annual traffic volume. As shown in Table 12, the

numbers of person hours of travel time saved (autos and trucks combined[30]) for the overall study period are as follows: Corridor 5-4A—17.5 million and for Corridor 4-4A—17.9 million.

TABLE 12
ESTIMATED TOTAL TRAVEL TIME SAVED
(person hours)
NON-TOLL OPTION

	Corridor 5-4A		Corridor 4-4A	
Year	Autos	Trucks	Autos	Trucks
2010	587,350	43,061	598,851	43,904
2011	625,083	45,827	637,323	46,725
2012	662,816	48,594	675,794	49,545
2013	700,549	51,360	714,266	52,366
2014	738,282	54,126	752,737	55,186
2015	776,014	56,893	791,209	58,007
2016	813,747	59,659	829,681	60,827
2017	851,480	62,425	868,152	63,648
2018	889,213	65,192	906,624	66,468
2019	926,946	67,958	945,096	69,289
2020	964,678	70,724	983,567	72,109
2021	1,002,411	73,491	1,022,039	74,930
2022	1,040,144	76,257	1,060,511	77,750
2023	1,077,877	79,023	1,098,982	80,571
2024	1,115,610	81,790	1,137,454	83,391
2025	1,153,342	84,556	1,175,925	86,212
2026	1,191,075	87,322	1,214,397	89,032
2027	1,228,808	90,089	1,252,869	91,853
Totals	16,345,426	1,198,345	16,665,476	1,221,809

[30] Tables A-14 and A-15 in Appendix A contain the lower and upper estimates of the total time saved (person hours) by automobiles and trucks, respectively.

Value of Time Savings

Given the estimates of the number of person hours of travel that would be saved utilizing each of the alternative corridors, it is necessary to make three further assumptions in order to determine the values of the time saved.

1) The values of saved time differ between local and intercity travel. Thus, it is necessary to make an assumption concerning the classification of travelers utilizing the access road. Since the access road is not located entirely within a city and it is anticipated that its primary users will be engaged in travel by air, travel on the access road will be classified as intercity in nature.

2) Information available from a study of 924 of Northwest Arkansas Regional Airport's passengers[31] suggests that 67.9% of them are business travelers (either frequent or infrequent) and that 32.1% travel for leisure related purposes. Given that the highway being studied will serve as an access road to the Northwest Arkansas Regional Airport, it appears reasonable to assume that between 64.9% and 70.9% of the individuals using the airport will be doing so for business related purposes and between 29.1% and 35.1% will be doing so for personal reasons.[32]

3) The values of travel time are assumed to be those recommended by the U.S. Department of Transportation.[33] The recommended hourly wage numbers for intercity travel (as revised)

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[31] Traveler Demographics, 2004 Customer Satisfaction Survey, Northwest Arkansas Regional Airport, Terrapin Consulting LLC

[32] This is a 95% confidence interval estimate and assumes that the sample was random.

[33] "The Value of Travel Time: Departmental Guidance for Conducting Economic Evaluations", Memorandum, Office of the Secretary of Transportation, U.S. Department of Transportation, April 9, 1997.

are $23.30 for personal travel, $40.10 for business travel and $18.10 for truck drivers.[34]

TABLE 13
VALUE OF SAVED TRAVEL TIME
NON-TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$21,164,687	$21,579,101
2011	22,524,358	22,965,395
2012	23,884,029	24,351,688
2013	25,243,700	25,737,982
2014	26,603,371	27,124,276
2015	27,963,042	28,510,570
2016	29,322,712	29,896,863
2017	30,682,383	31,283,157
2018	32,042,054	32,669,451
2019	33,401,725	34,055,745
2020	34,761,396	35,442,038
2021	36,121,066	36,828,332
2022	37,480,737	38,214,626
2023	38,840,408	39,600,920
2024	40,200,079	40,987,213
2025	41,559,750	42,373,507
2026	42,919,421	43,759,801
2027	44,279,091	45,146,095
Totals	$588,994,009	$600,526,759

[34] It is recognized that the Departmental Guidance document also recommends the utilization of "plausible ranges" for the values. The sensitivity of the estimates to possible ranges of various determining factors is considered, where appropriate, in the discussions in Appendix D of this report.

Assuming that travel on the access road is intercity travel, that 67.9% of the automobile occupants are business travelers, and the hourly wage numbers are those recommended by the U. S. Department of Transportation (assumptions 1, 2 and 3), the value of saved travel time has been calculated for each of the alternative corridors under study and is presented in Table 13. The present values of the values of saved travel time are presented in Table 14.

TABLE 14
PRESENT VALUE OF SAVED TRAVEL TIME
NON-TOLL OPTION

Year	**Corridor 5-4A**	**Corridor 4-4A**
2010	$16,702,006	$17,029,038
2011	16,612,134	16,937,407
2012	16,462,539	16,784,882
2013	16,261,419	16,579,825
2014	16,016,158	16,329,761
2015	15,733,390	16,041,456
2016	15,419,073	15,720,984
2017	15,078,545	15,373,789
2018	14,716,580	15,004,737
2019	14,337,442	14,618,175
2020	13,944,926	14,217,973
2021	13,542,405	13,807,571
2022	13,132,868	13,390,015
2023	12,718,956	12,967,998
2024	12,302,994	12,543,891
2025	11,887,021	12,119,774
2026	11,472,820	11,697,463
2027	11,061,939	11,278,536
Totals	$257,403,213	$262,443,276

The selection of Corridor 5-4A will result in $589 million in saved time. The amount of savings for Corridor 5-4A has a present value of $257 million. For Corridor 4-4A, the value of the saved time is $601 million and the present value of that savings is $262 million.

Savings in Vehicle Operating Costs

The operating cost of motor vehicles is a function of the type of vehicle and the number of miles traveled, among other factors. Since each of the proposed alternative corridors will result in a reduction in the total number of miles driven annually (See Table 15.), both automobiles and trucks traveling the proposed alternate corridors will have savings in operating costs.

Annually the American Automobile Association estimates driving costs for passenger vehicles.[35] For 2005, the arithmetic mean operating cost (gas, maintenance and tires) of the five types of passenger vehicles included in the American Automobile Association study was $0.149 per mile. Given that operating cost, and assuming that eighty-eight percent of the traffic volume traveling the access road consists of passenger vehicles, the annual automobile operating cost savings is presented in Table 16.

[35] YOUR DRIVING COSTS, 2005, AAA Association Communication, www.aaa.com. The models for which driving costs were computed are as follows: Chevrolet Cavalier LS (4-cyl., 2.2 liter), Ford Taurus SEL (6-cyl., 3.0 liter), Mercury Grand Marquis LS (8-cyl., 4.6 liter), Chevrolet TrailBlazer LS (6-cyl., 4.3 liter) and Dodge Caravan SXT (6-cyl., 3.3 liter). Each of the vehicles was a 2005 model.

TABLE 15
TOTAL TRAVEL MILES SAVED ANNUALLY
NON-TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	6,323,625	6,775,313
2011	6,729,870	7,210,575
2012	7,136,115	7,645,838
2013	7,542,360	8,081,100
2014	7,948,605	8,516,363
2015	8,354,850	8,951,625
2016	8,761,095	9,386,888
2017	9,167,340	9,822,150
2018	9,573,585	10,257,413
2019	9,979,830	10,692,675
2020	10,386,075	11,127,938
2021	10,792,320	11,563,200
2022	11,198,565	11,998,463
2023	11,604,810	12,433,725
2024	12,011,055	12,868,988
2025	12,417,300	13,304,250
2026	12,823,545	13,739,513
2027	13,229,790	14,174,775
Totals	175,980,735	188,550,788

TABLE 16
AUTOMOBILE OPERATING COST SAVINGS
NON-TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$829,154	$888,379
2011	882,421	945,451
2012	935,687	1,002,522
2013	988,954	1,059,594
2014	1,042,221	1,116,665
2015	1,095,488	1,173,737
2016	1,148,755	1,230,809
2017	1,202,022	1,287,880
2018	1,255,288	1,344,952
2019	1,308,555	1,402,024
2020	1,361,822	1,459,095
2021	1,415,089	1,516,167
2022	1,468,356	1,573,238
2023	1,521,623	1,630,310
2024	1,574,890	1,687,382
2025	1,628,156	1,744,453
2026	1,681,423	1,801,525
2027	1,734,690	1,858,596
Totals	$23,074,594	$24,722,779

As shown in Table 16, Corridor 4-4A produces the greatest amount of savings in automobile operating costs over the 2010 through 2027 period with a total of approximately $24.7 million. The automobile operating cost savings for Corridor 5-4A is slightly more than $23 million.

TABLE 17
TRUCK OPERATING COST SAVINGS
NON-TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$2,008,940	$2,152,435
2011	2,137,999	2,290,713
2012	2,267,058	2,428,991
2013	2,396,117	2,567,268
2014	2,525,176	2,705,546
2015	2,654,236	2,843,824
2016	2,783,295	2,982,102
2017	2,912,354	3,120,379
2018	3,041,413	3,258,657
2019	3,170,472	3,396,935
2020	3,299,531	3,535,212
2021	3,428,591	3,673,490
2022	3,557,650	3,811,768
2023	3,686,709	3,950,045
2024	3,815,768	4,088,323
2025	3,944,827	4,226,601
2026	4,073,886	4,364,878
2027	4,202,946	4,503,156
Totals	$55,906,968	$59,900,323

It is estimated that twelve percent of the traffic on a new corridor will consist of trucks. From data published by the American Trucking Associations,[36] it is possible to calculate the annual operating cost per highway mile traveled for Class I and Class II carriers.[37] For 2002, that number was approximately $2.65

[36] Motor Carrier Annual Reports, 2002, American Trucking Associations
[37] The US Department of Transportation requires that Class I and Class II carriers report annually their operating costs and highway miles traveled, among other items. The per mile operating cost reported here is the result of dividing the sum of the operating costs of all reporting carriers by the sum of their highway miles traveled.

per mile. Utilizing that number, the annual operating cost savings for trucks is provided in Table 17.

The total calculated amount of operating cost savings for trucks using Corridor 4-4A for the period 2010 through 2027 is approximately $59.9 million, and that for Corridor 5-4A is $55.9 million.

TABLE 18
PRESENT VALUE
AUTOMOBILE AND TRUCK OPERATING COST SAVINGS
NON-TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$2,239,667	$2,399,643
2011	2,227,616	2,386,731
2012	2,207,556	2,365,238
2013	2,180,586	2,336,343
2014	2,147,698	2,301,105
2015	2,109,780	2,260,478
2016	2,067,631	2,215,319
2017	2,021,968	2,166,394
2018	1,973,430	2,114,389
2019	1,922,589	2,059,917
2020	1,869,955	2,003,523
2021	1,815,978	1,945,691
2022	1,761,061	1,886,851
2023	1,705,557	1,827,383
2024	1,649,778	1,767,620
2025	1,593,998	1,707,855
2026	1,538,456	1,648,346
2027	1,483,358	1,589,313
Totals	$34,516,663	$36,982,139

In Table 18, the operating cost savings for both automobiles and trucks have been combined and the totals have been reduced to their present values in 2007. In terms of its present value, the operating costs savings for all vehicles utilizing Corridor 5-4A is $34.5 million over the 2010 through 2027 period. The present value of savings in vehicle operating costs for Corridor 4-4A is approximately $37.0 million.

Summary of Quantified Economic Impacts

Table 19 presents the summary of the positive and negative quantified economic impacts of Corridor 5-4A. The quantified positive and negative economic impacts of this corridor indicate that there will be a total economic impact of almost $713.5 million over the period from 2008 through 2027. The present value as of 2007 of the total economic impact is approximately $311.4 million. (See Table 21.)

TABLE 19
QUANTIFIED ECONOMIC IMPACT SUMMARY
CORRIDOR 5-4A
NON-TOLL OPTION

Year	Positive Impacts			Negative Impacts		Total Economic Impact
	Crash Reduction	Time Savings	Operating Costs Savings	Government Tax Revenues	Traffic Diversion	
2008				$176,463		($176,463)
2009				$352,927		($352,927)
2010	$1,932,681	$21,164,687	$2,838,093	352,927	$49,825	25,532,710
2011	2,056,841	22,524,358	3,020,419	352,927	53,026	27,195,666
2012	2,181,001	23,884,029	3,202,746	352,927	56,227	28,858,622
2013	2,305,161	25,243,700	3,385,072	352,927	59,428	30,521,578
2014	2,429,321	26,603,371	3,567,398	352,927	62,629	32,184,534
2015	2,553,481	27,963,042	3,749,724	352,927	65,829	33,847,490
2016	2,677,641	29,322,712	3,932,050	352,927	69,030	35,510,446
2017	2,801,802	30,682,383	4,114,376	352,927	72,231	37,173,402
2018	2,925,962	32,042,054	4,296,702	352,927	75,432	38,836,358
2019	3,050,122	33,401,725	4,479,028	352,927	78,633	40,499,314
2020	3,174,282	34,761,396	4,661,354	352,927	81,834	42,162,270
2021	3,298,442	36,121,066	4,843,680	352,927	85,035	43,825,226
2022	3,422,602	37,480,737	5,026,006	352,927	88,236	45,488,183
2023	3,546,762	38,840,408	5,208,332	352,927	91,436	47,151,139
2024	3,670,922	40,200,079	5,390,658	352,927	94,637	48,814,095
2025	3,795,082	41,559,750	5,572,984	352,927	97,838	50,477,051
2026	3,919,243	42,919,421	5,755,310	352,927	101,039	52,140,007
2027	4,043,403	44,279,091	5,937,636	352,927	104,240	53,802,963
Totals	$53,784,751	$588,994,009	$78,981,562	$6,882,074	$1,386,585	$713,491,663

The quantified positive and negative economic impacts of Corridor 4-4A are presented in Table 20. The total for the period 2008 through 2027 is over

$731 million for this corridor. The 2007 present value of the economic impact is approximately $319.1 million as shown in Table 21.

TABLE 20
QUANTIFIED ECONOMIC IMPACT SUMMARY
CORRIDOR 4-4A
NON-TOLL OPTION

Year	Positive Impacts			Negative Impacts		Total Economic Impact
	Crash Reduction	Time Savings	Operating Costs Savings	Government Tax Revenues	Traffic Diversion	
2008				$170,252		($170,252)
2009				340,505		($340,505)
2010	$1,944,792	$21,579,101	$3,040,814	340,505	$49,825	26,174,378
2011	2,069,730	22,965,395	3,236,164	340,505	53,026	27,877,758
2012	2,194,668	24,351,688	3,431,513	340,505	56,227	29,581,138
2013	2,319,607	25,737,982	3,626,862	340,505	59,428	31,284,519
2014	2,444,545	27,124,276	3,822,212	340,505	62,629	32,987,899
2015	2,569,483	28,510,570	4,017,561	340,505	65,829	34,691,279
2016	2,694,421	29,896,863	4,212,910	340,505	69,030	36,394,660
2017	2,819,359	31,283,157	4,408,259	340,505	72,231	38,098,040
2018	2,944,297	32,669,451	4,603,609	340,505	75,432	39,801,420
2019	3,069,235	34,055,745	4,798,958	340,505	78,633	41,504,801
2020	3,194,174	35,442,038	4,994,307	340,505	81,834	43,208,181
2021	3,319,112	36,828,332	5,189,657	340,505	85,035	44,911,561
2022	3,444,050	38,214,626	5,385,006	340,505	88,236	46,614,941
2023	3,568,988	39,600,920	5,580,355	340,505	91,436	48,318,322
2024	3,693,926	40,987,213	5,775,705	340,505	94,637	50,021,702
2025	3,818,864	42,373,507	5,971,054	340,505	97,838	51,725,082
2026	3,943,803	43,759,801	6,166,403	340,505	101,039	53,428,463
2027	4,068,741	45,146,095	6,361,752	340,505	104,240	55,131,843
Totals	$54,121,795	$600,526,759	$84,623,102	$6,639,842	$1,386,585	$731,245,229

TABLE 21
PRESENT VALUE
TOTAL QUANTIFIED ECONOMIC IMPACT
NON-TOLL OPTION

Year	Corridor	
	5-4A	4-4A
2008	($159,433)	($153,822)
2009	($298,006)	($287,517)
2010	$20,149,009	$20,655,378
2011	$20,057,310	$20,560,366
2012	$19,891,375	$20,389,384
2013	$19,661,309	$20,152,778
2014	$19,376,213	$19,859,866
2015	$19,044,271	$19,519,029
2016	$18,672,834	$19,137,789
2017	$18,268,490	$18,722,893
2018	$17,837,133	$18,280,376
2019	$17,384,029	$17,815,627
2020	$16,913,870	$17,333,449
2021	$16,430,826	$16,838,111
2022	$15,938,595	$16,333,400
2023	$15,440,446	$15,822,661
2024	$14,939,261	$15,308,843
2025	$14,437,569	$14,794,534
2026	$13,937,581	$14,282,000
2027	$13,441,222	$13,773,207
Totals	$311,363,906	$319,138,352

Other (Non-Quantified) Economic Impacts[38]

Since access to the proposed new highway will be controlled (by design), the selection of any route will cause a disruption of access to the parcels of land bisected by the right-of-way. However, the area traversed by each alternative corridor is primarily rural (agricultural) in character (with the exception of the two subdivisions discussed in this report) and, consequently, sparsely populated so that this impact, should it occur, will be minimal in the aggregate. However, as previously noted, it will be necessary to acquire a number of parcels in the Spring Creek Park subdivision because they will become inaccessible as a result of the construction of the access road regardless of which of the alternative corridors is selected.

For purposes of this report, it has been assumed that individuals losing their homes and/or businesses to the access road will not relocate them elsewhere in Washington or Benton Counties. It is not certain that this will be the case in all instances and to the extent they do not exit the area, the general level of economic activity will be positively impacted beyond that set forth in this report

In its Draft Report, Wilbur Smith Associates (WSA) notes "The airport will clearly be a focal point for future development and infrastructure expansion over the next 20 years."[39] At a later point in that report, WSA makes the following statement. "Given the current profile of development and the plans for future development at XNA, there appears to be a great potential for additional travel demand in the future within the study area."[40] While an effort has been made to incorporate in the projections of traffic the amount of induced traffic that will be associated with the access road, it is not possible to quantify in exact terms the

[38] Some of the impacts discussed in this section are non-quantifiable and no reasonable estimates of their values can be developed for the purposes of this study.
[39] Draft Report, Northwest Arkansas Regional Airport Intermodal Access Road, Preliminary Traffic and Revenue Study, Wilbur Smith Associates, April 2000, p. 7.
[40] Ibid, p. 9

amount of additional traffic construction of the access road will induce.[41] Thus, to the extent that there is imprecision in the projections as a result of the inability to achieve exact quantification, there are economic impacts that have not been quantified in this report.

Anecdotal evidence suggests that the present route from XNA creates a negative impression upon visitors to the area. The construction of the access road should alleviate problems of that nature and their associated negative impacts.

The reduction in the volume of traffic between the point where the selected corridor intersects I-540 and SH 264 will reduce congestion and possibly increase average travel speed. As noted elsewhere in this report, SH 264 is expected to experience increased use with the further development of subdivisions currently under construction. A reduction in the use of SH 264 for access to XNA would provide benefits for those continuing to travel that highway. However, neither of these economic benefits is readily quantifiable and have not been incorporated in the benefits calculations for the alternative corridors.

Both alternative corridors require the acquisition of a currently undeveloped forty-acre limestone deposit that is adjacent to an existing limestone quarry. Given that the location of this deposit is in close proximity to an area currently undergoing a rapid rate of economic expansion, if the next best available source of limestone is in a location further from current building activity, there will be added transportation costs (and a negative economic impact) associated with the loss of this source of limestone. At this point the feasibility of extracting any portion of that deposit after the construction of the access road is unknown.

[41] Ibid

Right-of-Way, Construction, Operating and Maintenance Costs

In analyzing the economic impact of constructing an access road for XNA, right-of-way acquisition is expected to be initiated in the first quarter of 2007 and completed by the end of the year. It is anticipated that construction of the access road will begin in the first quarter of 2008 and be completed by the end of 2009. With the utilization of the access road beginning in 2010, operating and maintenance costs will commence in that year.

The nominal dollar estimated right-of-way acquisition costs, construction and operating and maintenance costs for the alternative corridors over the 2007 to 2027 period are $93.2 million (Corridor 5-4A) and $92.7 million (Corridor 4-4A). The corresponding present values (2007) are $84.7 million and $84.3 million. The details of the costs are presented in nominal dollars[42] in Table 22, and are shown converted to their present values (as of 2007) in Table 23.

[42] CH2MHill estimated unit costs per mile as of July 2006, and incremented the costs by 3.8% per year to estimate costs in 2008. Right-of-way and Operations and Maintenance were projected to have a 5% increase (annually) from 2006.

TABLE 22
RIGHT-OF-WAY ACQUISITION COSTS,
CONSTRUCTION, AND OPERATIONS AND MAINTENANCE COSTS
NON-TOLL OPTION

Year	Corridor 5-4A			Corridor 4-4A		
	Right of Way	Construction	Operations and Maintenance	Right of Way	Construction	Operations and Maintenance
2007	$38,346,000			$38,346,000		
2008		$27,098,369			$26,846,369	
2009		$27,098,369			$26,846,369	
2010			$37,011			$36,602
2011			$37,011			$36,602
2012			$37,011			$36,602
2013			$37,011			$36,602
2014			$37,011			$36,602
2015			$37,011			$36,602
2016			$37,011			$36,602
2017			$37,011			$36,602
2018			$37,011			$36,602
2019			$37,011			$36,602
2020			$37,011			$36,602
2021			$37,011			$36,602
2022			$37,011			$36,602
2023			$37,011			$36,602
2024			$37,011			$36,602
2025			$37,011			$36,602
2026			$37,011			$36,602
2027			$37,011			$36,602
Totals	$38,346,000	$54,196,738	$666,198	$38,346,000	$53,692,738	$658,836

Source: CH2MHill

TABLE 23
PRESENT VALUE
RIGHT-OF-WAY ACQUISITION COSTS,
CONSTRUCTION AND OPERATIONS AND MAINTENACE COSTS
NON-TOLL OPTION

Year	Corridor 5-4A			Corridor 4-4A		
	Right of Way	Construction	Operations and Maintenance	Right of Way	Construction	Operations and Maintenance
2007	$37,070,477			$37,070,477		
2008		$24,483,161			$24,255,481	
2009		$22,881,459			$22,668,674	
2010			$29,207			$28,884
2011			$27,296			$26,995
2012			$25,511			$25,229
2013			$23,842			$23,578
2014			$22,282			$22,036
2015			$20,824			$20,594
2016			$19,462			$19,247
2017			$18,189			$17,988
2018			$16,999			$16,811
2019			$15,887			$15,711
2020			$14,847			$14,683
2021			$13,876			$13,723
2022			$12,968			$12,825
2023			$12,120			$11,986
2024			$11,327			$11,202
2025			$10,586			$10,469
2026			$9,893			$9,784
2027			$9,246			$9,144
Totals	$37,070,477	$47,364,620	$314,362	$37,070,477	$46,924,155	$310,888

Conclusions

The net totals of the quantified economic benefits, costs and net impacts over the period beginning in 2007 and extending through 2027 are $620.3 million for Corridor 5-4A and for Corridor 4-4A, $638.5 million. In nominal dollar terms these amounts result to an annual yield (compounded) on the investment (right-of-way, construction and operating and maintenance expenditures) of approximately 10.7% and 10.9% for 5-4A and 4-4A, respectively.[43] When reduced to their 2007 present values, the net totals of the quantified economic benefits are $226.6 million (Corridor 5-4A) and $234.8 million (Corridor 4-4A). These present values, when compared to the present values of the project investment, result in annual returns through 2027 of approximately 6.7% for Corridor 5-4A and 6.9% for Corridor 4-4A.

Another way to view the economic performance of a project is in terms of how long it requires for the positive economic benefits to repay the costs of the investment. Viewed in nominal dollars, the costs of the investment in the access road will be recovered by its positive economic benefits in its fourth year of operations (2013). When measured in constant dollars, the positive economic benefits will be sufficient to recover the cost of the investment in the access road's fifth year of operations, or 2014. The recovery rates for the alternative Corridors are almost identical, with Corridor 4-4A enjoying a very small time advantage.

The details of the net total quantified economic benefits for both alternative corridors are summarized and presented in Table 24 and the present values of those quantities are provided in Table 25.

[43] The rate of return is actually in excess of this since the calculation assumes that all investments are made at the outset of the project.

As a result of the close proximity of the alignments of the two alternative corridors, any non-quantified economic impacts are expected to be either the same are similar. Thus, the differences in the quantified net impacts should be a reasonable basis for comparing the two alternatives.

TABLE 24
SUMMARY OF QUANTIFIED ECONOMIC IMPACTS AND COSTS
NON-TOLL OPTION

	Corridor 5-4A			Corridor 4-4A		
Year	Total Economic Impact	Project Costs	Net Impact	Total Economic Impact	Project Costs	Net Impact
2007		$38,346,000	($38,346,000)		$38,346,000	($38,346,000)
2008	($176,463)	27,098,369	(27,274,832)	($170,252)	26,846,369	(27,016,621)
2009	($352,927)	27,098,369	(27,451,296)	($340,505)	26,846,369	(27,186,874)
2010	$25,532,710	37,011	25,495,699	$26,174,378	36,602	26,137,776
2011	$27,195,666	37,011	27,158,655	$27,877,758	36,602	27,841,156
2012	$28,858,622	37,011	28,821,611	$29,581,138	36,602	29,544,536
2013	$30,521,578	37,011	30,484,567	$31,284,519	36,602	31,247,917
2014	$32,184,534	37,011	32,147,523	$32,987,899	36,602	32,951,297
2015	$33,847,490	37,011	33,810,479	$34,691,279	36,602	34,654,677
2016	$35,510,446	37,011	35,473,435	$36,394,660	36,602	36,358,058
2017	$37,173,402	37,011	37,136,391	$38,098,040	36,602	38,061,438
2018	$38,836,358	37,011	38,799,347	$39,801,420	36,602	39,764,818
2019	$40,499,314	37,011	40,462,303	$41,504,801	36,602	41,468,199
2020	$42,162,270	37,011	42,125,259	$43,208,181	36,602	43,171,579
2021	$43,825,226	37,011	43,788,215	$44,911,561	36,602	44,874,959
2022	$45,488,183	37,011	45,451,172	$46,614,941	36,602	46,578,339
2023	$47,151,139	37,011	47,114,128	$48,318,322	36,602	48,281,720
2024	$48,814,095	37,011	48,777,084	$50,021,702	36,602	49,985,100
2025	$50,477,051	37,011	50,440,040	$51,725,082	36,602	51,688,480
2026	$52,140,007	37,011	52,102,996	$53,428,463	36,602	53,391,861
2027	$53,802,963	37,011	53,765,952	$55,131,843	36,602	55,095,241
Totals	$713,491,663	$93,208,936	$620,282,727	$731,245,229	$92,697,574	$638,547,655

TABLE 25
NET QUANTIFIED ECONOMIC IMPACTS
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Net Quantified Economic Impact	Present Value of Net Impact	Net Quantified Economic Impact	Present Value of Net Impact
2007	($38,346,000)	($37,070,477)	($38,346,000)	($37,070,477)
2008	(27,274,832)	(24,642,594)	(27,016,621)	(24,409,303)
2009	(27,451,296)	(23,179,465)	(27,186,874)	(22,956,191)
2010	25,495,699	20,119,802	26,137,776	20,626,493
2011	27,158,655	20,030,014	27,841,156	20,533,371
2012	28,821,611	19,865,865	29,544,536	20,364,155
2013	30,484,567	19,637,467	31,247,917	20,129,200
2014	32,147,523	19,353,931	32,951,297	19,837,831
2015	33,810,479	19,023,447	34,654,677	19,498,435
2016	35,473,435	18,653,372	36,358,058	19,118,543
2017	37,136,391	18,250,301	38,061,438	18,704,906
2018	38,799,347	17,820,134	39,764,818	18,263,565
2019	40,462,303	17,368,143	41,468,199	17,799,916
2020	42,125,259	16,899,023	43,171,579	17,318,766
2021	43,788,215	16,416,950	44,874,959	16,824,389
2022	45,451,172	15,925,627	46,578,339	16,320,575
2023	47,114,128	15,428,327	48,281,720	15,810,675
2024	48,777,084	14,927,935	49,985,100	15,297,641
2025	50,440,040	14,426,983	51,688,480	14,784,065
2026	52,102,996	13,927,688	53,391,861	14,272,215
2027	53,765,952	13,431,976	55,095,241	13,764,063
Totals	$620,282,727	$226,614,447	$638,547,655	$234,832,832

APPENDIX A

SUPPORTING TABLES FOR NON-TOLL ECONOMIC IMPACT COMPUTATIONS

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TABLE A-1
SUMMARY OF PARCEL CHARACTERISTICS IN THE ALTERNATIVE CORRIDORS

Corridor	Parcels	Parcel Owners	Total Acres in Parcels	Percent in Forest	Number with Improvements	Appraised Value of Impacted Parcels	Acres in Right-of-Way	Effective Assessed Value of Right-of-Way	Total Annual Tax Revenue Lost
5-4A	208	173	2,184.59	77.6	164	$43,029,850	542	$ 6,709,171	$ 352,927
4-4A	210	172	2,167.32	84.8	165	$43,047,150	538	$ 6,696,862	$ 340,505

TABLE A-2
MILLAGE RATES
2005

Taxing Unit		Mills			
		School	City	County	NWACC
6	**School District**	40.8		6.0	2.6
C6	**City of Bentonville**	40.8	5.4	6.0	2.6
CH6	**City of Highfill**	40.8	5.0	6.0	2.6
19	**School District**	40.0		6.0	
CH19	**City of Highfill**	40.0	5.0	6.0	
30	**School District**	39.4		6.0	2.6
CL30	**City of Lowell**	39.4	5.2	6.0	2.6
50	**School District**	39.3		6.0	
C50	**City of Springdale**	39.3	5.7	6.0	

Source: County Clerk, Benton County, Arkansas

TABLE A-3
TRAFFIC DIVERSION IMPACT ON BUSINESSES
CAVE SPRINGS, ELM SPRINGS and LOWELL
2002 and Estimated 2007

		Weekly Sales Northwest Arkansas Regional Airport Related Traffic	
Location	Establishment	2002	Estimated 2007
Cave Springs	A	$100	$117
Cave Springs	B	175	206
Cave Springs	C	0	0
Cave Springs	D	0	0
Cave Springs	E	0	0
Elm Springs	F	140	164
Elm Springs	G	300	352
Lowell	H	0	0
Lowell	I	0	0
Total		$715	$840

TABLE A-4
PROJECTED ANNUAL MILES TRAVELED ON ALTERNATIVE CORRIDORS
and
MILES SAVED WHEN COMPARED TO CURRENT ROUTE
NON-TOLL OPTION

Year	Corridor 4A-5			Corridor 4A-4		
	Daily Traffic Volume	Annual Miles Traveled on Proposed Route	Annual Miles Travel Miles Saved	Daily Traffic Volume	Annual Miles Traveled on Proposed Route	Annual Miles Travel Miles Saved
2010	8,250	26,499,000	6,323,625	8,250	26,047,313	6,775,313
2011	8,780	28,201,360	6,729,870	8,780	27,720,655	7,210,575
2012	9,310	29,903,720	7,136,115	9,310	29,393,998	7,645,838
2013	9,840	31,606,080	7,542,360	9,840	31,067,340	8,081,100
2014	10,370	33,308,440	7,948,605	10,370	32,740,683	8,516,363
2015	10,900	35,010,800	8,354,850	10,900	34,414,025	8,951,625
2016	11,430	36,713,160	8,761,095	11,430	36,087,368	9,386,888
2017	11,960	38,415,520	9,167,340	11,960	37,760,710	9,822,150
2018	12,490	40,117,880	9,573,585	12,490	39,434,053	10,257,413
2019	13,020	41,820,240	9,979,830	13,020	41,107,395	10,692,675
2020	13,550	43,522,600	10,386,075	13,550	42,780,738	11,127,938
2021	14,080	45,224,960	10,792,320	14,080	44,454,080	11,563,200
2022	14,610	46,927,320	11,198,565	14,610	46,127,423	11,998,463
2023	15,140	48,629,680	11,604,810	15,140	47,800,765	12,433,725
2024	15,670	50,332,040	12,011,055	15,670	49,474,108	12,868,988
2025	16,200	52,034,400	12,417,300	16,200	51,147,450	13,304,250
2026	16,730	53,736,760	12,823,545	16,730	52,820,793	13,739,513
2027	17,260	55,439,120	13,229,790	17,260	54,494,135	14,174,775
Total		737,443,080	175,980,735		724,873,028	188,550,788

TABLE A-5
EXPECTED ANNUAL NUMBER OF CRASHES AND THEIR OUTCOMES
CORRIDOR 5-4A
NON-TOLL OPTION

Year	Number of Crashes		Crash Outcomes									
			Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only	
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route
2010	15	41	0.10	0.37	0.42	4.62	4.26	6.98	8.10	21.77	8.52	23.76
2011	16	43	0.11	0.39	0.44	4.91	4.53	7.43	8.62	23.17	9.06	25.29
2012	17	46	0.12	0.41	0.47	5.21	4.80	7.88	9.14	24.56	9.61	26.81
2013	18	49	0.12	0.44	0.50	5.51	5.08	8.32	9.66	25.96	10.16	28.34
2014	19	51	0.13	0.46	0.52	5.80	5.35	8.77	10.18	27.36	10.70	29.87
2015	20	54	0.14	0.48	0.55	6.10	5.63	9.22	10.70	28.76	11.25	31.39
2016	21	56	0.14	0.51	0.58	6.40	5.90	9.67	11.22	30.16	11.80	32.92
2017	22	59	0.15	0.53	0.60	6.69	6.17	10.12	11.74	31.56	12.34	34.44
2018	23	62	0.16	0.56	0.63	6.99	6.45	10.57	12.26	32.96	12.89	35.97
2019	24	64	0.16	0.58	0.66	7.29	6.72	11.01	12.78	34.35	13.44	37.50
2020	25	67	0.17	0.60	0.68	7.58	6.99	11.46	13.30	35.75	13.99	39.02
2021	26	70	0.18	0.63	0.71	7.88	7.27	11.91	13.82	37.15	14.53	40.55
2022	27	72	0.18	0.65	0.74	8.18	7.54	12.36	14.34	38.55	15.08	42.08
2023	28	75	0.19	0.67	0.76	8.47	7.81	12.81	14.86	39.95	15.63	43.60
2024	29	77	0.20	0.70	0.79	8.77	8.09	13.26	15.39	41.35	16.17	45.13
2025	30	80	0.20	0.72	0.82	9.07	8.36	13.70	15.91	42.74	16.72	46.66
2026	31	83	0.21	0.74	0.84	9.36	8.63	14.15	16.43	44.14	17.27	48.18
2027	32	85	0.22	0.77	0.87	9.66	8.91	14.60	16.95	45.54	17.82	49.71
Totals	428	1,135	3	10	12	128	118	194	225	606	237	661

TABLE A-6
EXPECTED ANNUAL NUMBER OF CRASHES AND THEIR OUTCOMES
CORRIDOR 4-4A
NON-TOLL OPTION

Year	Number of Crashes		Crash Outcomes									
			Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only	
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route
2010	15	41	0.10	0.37	0.41	4.62	4.19	6.98	7.96	21.77	8.37	23.76
2011	16	43	0.11	0.39	0.43	4.91	4.45	7.43	8.47	23.17	8.91	25.29
2012	17	46	0.12	0.41	0.46	5.21	4.72	7.88	8.99	24.56	9.45	26.81
2013	18	49	0.12	0.44	0.49	5.51	4.99	8.32	9.50	25.96	9.98	28.34
2014	19	51	0.13	0.46	0.51	5.80	5.26	8.77	10.01	27.36	10.52	29.87
2015	20	54	0.13	0.48	0.54	6.10	5.53	9.22	10.52	28.76	11.06	31.39
2016	21	56	0.14	0.51	0.57	6.40	5.80	9.67	11.03	30.16	11.60	32.92
2017	22	59	0.15	0.53	0.59	6.69	6.07	10.12	11.54	31.56	12.13	34.44
2018	23	62	0.15	0.56	0.62	6.99	6.34	10.57	12.05	32.96	12.67	35.97
2019	24	64	0.16	0.58	0.64	7.29	6.60	11.01	12.57	34.35	13.21	37.50
2020	25	67	0.17	0.60	0.67	7.58	6.87	11.46	13.08	35.75	13.75	39.02
2021	26	70	0.17	0.63	0.70	7.88	7.14	11.91	13.59	37.15	14.29	40.55
2022	27	72	0.18	0.65	0.72	8.18	7.41	12.36	14.10	38.55	14.82	42.08
2023	28	75	0.19	0.67	0.75	8.47	7.68	12.81	14.61	39.95	15.36	43.60
2024	29	77	0.19	0.70	0.78	8.77	7.95	13.26	15.12	41.35	15.90	45.13
2025	30	80	0.20	0.72	0.80	9.07	8.22	13.70	15.63	42.74	16.44	46.66
2026	31	83	0.21	0.74	0.83	9.36	8.49	14.15	16.15	44.14	16.97	48.18
2027	32	85	0.21	0.77	0.85	9.66	8.76	14.60	16.66	45.54	17.51	49.71
Total	420	1,135	3	10	11	128	116	194	222	606	233	661

TABLE A-7
COMPREHENSIVE COSTS IN POLICE-REPORTED CRASHES
BY K-B-B-C SCALE SEVERITY

Severity			
Arkansas Scale	K-B-B-C Scale	**Descriptor**	**Cost per Injury**
1	**K**	Fatal	$3,000,000
2	**A**	Incapacitating Injury	$180,000
3	**B**	Evident Injury	$36,000
4	**C**	Possible Injury	$19,000
5	**PDO**	Property Damage Only	$2,000

Sources: US Department of Transportation, Federal Highway Administration, Technical Advisory, MOTOR VEHICLE ACCIDENT COSTS, T 7570.2, October 31, 1994

TABLE A-8
TRAVELERS WILLINGNESS TO PAY TO REDUCE CRASH LOSSES
CORRIDOR 5-4A
NON-TOLL OPTION

Year	Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only		Total		Reduction in Crash Losses
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	
2010	$311,542	$1,099,789	$74,770	$831,071	$153,279	$251,234	$153,902	$413,593	$17,031	$47,519	$710,524	$2,643,205	$1,932,681
2011	331,557	1,170,442	79,574	884,461	163,126	267,374	163,789	440,163	18,125	50,572	756,170	2,813,011	2,056,841
2012	351,571	1,241,095	84,377	937,851	172,973	283,514	173,676	466,733	19,219	53,625	801,816	2,982,817	2,181,001
2013	371,585	1,311,748	89,180	991,241	182,820	299,653	183,563	493,303	20,313	56,677	847,462	3,152,623	2,305,161
2014	391,599	1,382,401	93,984	1,044,631	192,667	315,793	193,450	519,874	21,407	59,730	893,107	3,322,429	2,429,321
2015	411,613	1,453,054	98,787	1,098,021	202,514	331,933	203,337	546,444	22,502	62,783	938,753	3,492,234	2,553,481
2016	431,628	1,523,707	103,591	1,151,411	212,361	348,073	213,224	573,014	23,596	65,836	984,399	3,662,040	2,677,641
2017	451,642	1,594,360	108,394	1,204,801	222,208	364,213	223,111	599,584	24,690	68,888	1,030,045	3,831,846	2,801,802
2018	471,656	1,665,013	113,197	1,258,191	232,055	380,353	232,998	626,154	25,784	71,941	1,075,690	4,001,652	2,925,962
2019	491,670	1,735,666	118,001	1,311,581	241,902	396,493	242,885	652,725	26,878	74,994	1,121,336	4,171,458	3,050,122
2020	511,685	1,806,319	122,804	1,364,971	251,749	412,633	252,772	679,295	27,972	78,046	1,166,982	4,341,264	3,174,282
2021	531,699	1,876,972	127,608	1,418,361	261,596	428,772	262,659	705,865	29,066	81,099	1,212,628	4,511,070	3,298,442
2022	551,713	1,947,626	132,411	1,471,751	271,443	444,912	272,546	732,435	30,160	84,152	1,258,274	4,680,876	3,422,602
2023	571,727	2,018,279	137,215	1,525,141	281,290	461,052	282,433	759,005	31,254	87,205	1,303,919	4,850,682	3,546,762
2024	591,742	2,088,932	142,018	1,578,531	291,137	477,192	292,320	785,576	32,349	90,257	1,349,565	5,020,488	3,670,922
2025	611,756	2,159,585	146,821	1,631,921	300,984	493,332	302,207	812,146	33,443	93,310	1,395,211	5,190,293	3,795,082
2026	631,770	2,230,238	151,625	1,685,311	310,831	509,472	312,094	838,716	34,537	96,363	1,440,857	5,360,099	3,919,243
2027	651,784	2,300,891	156,428	1,738,701	320,678	525,612	321,981	865,286	35,631	99,416	1,486,503	5,529,905	4,043,403
Totals	$8,669,939	$30,606,115	$2,080,785	$23,127,943	$4,265,610	$6,991,610	$4,282,950	$11,509,910	$473,957	$1,322,413	$19,773,241	$73,557,992	$53,784,751

TABLE A-9
TRAVELERS WILLINGNESS TO PAY TO REDUCE CRASH LOSSES
CORRIDOR 4-4A
NON-TOLL OPTION

Year	Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only		Total		Reduction in Crash Losses
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	
2010	$306,232	$1,099,789	$73,496	$831,071	$150,666	$251,234	$151,279	$413,593	$16,741	$47,519	$698,413	$2,643,205	$1,944,792
2011	325,905	1,170,442	78,217	884,461	160,345	267,374	160,997	440,163	17,816	50,572	743,281	2,813,011	2,069,730
2012	345,578	1,241,095	82,939	937,851	170,024	283,514	170,716	466,733	18,892	53,625	788,148	2,982,817	2,194,668
2013	365,251	1,311,748	87,660	991,241	179,704	299,653	180,434	493,303	19,967	56,677	833,016	3,152,623	2,319,607
2014	384,924	1,382,401	92,382	1,044,631	189,383	315,793	190,153	519,874	21,043	59,730	877,884	3,322,429	2,444,545
2015	404,597	1,453,054	97,103	1,098,021	199,062	331,933	199,871	546,444	22,118	62,783	922,752	3,492,234	2,569,483
2016	424,270	1,523,707	101,825	1,151,411	208,741	348,073	209,590	573,014	23,193	65,836	967,619	3,662,040	2,694,421
2017	443,943	1,594,360	106,546	1,204,801	218,420	364,213	219,308	599,584	24,269	68,888	1,012,487	3,831,846	2,819,359
2018	463,617	1,665,013	111,268	1,258,191	228,099	380,353	229,027	626,154	25,344	71,941	1,057,355	4,001,652	2,944,297
2019	483,290	1,735,666	115,990	1,311,581	237,779	396,493	238,745	652,725	26,420	74,994	1,102,223	4,171,458	3,069,235
2020	502,963	1,806,319	120,711	1,364,971	247,458	412,633	248,464	679,295	27,495	78,046	1,147,090	4,341,264	3,194,174
2021	522,636	1,876,972	125,433	1,418,361	257,137	428,772	258,182	705,865	28,571	81,099	1,191,958	4,511,070	3,319,112
2022	542,309	1,947,626	130,154	1,471,751	266,816	444,912	267,901	732,435	29,646	84,152	1,236,826	4,680,876	3,444,050
2023	561,982	2,018,279	134,876	1,525,141	276,495	461,052	277,619	759,005	30,722	87,205	1,281,694	4,850,682	3,568,988
2024	581,655	2,088,932	139,597	1,578,531	286,174	477,192	287,338	785,576	31,797	90,257	1,326,561	5,020,488	3,693,926
2025	601,328	2,159,585	144,319	1,631,921	295,853	493,332	297,056	812,146	32,873	93,310	1,371,429	5,190,293	3,818,864
2026	621,001	2,230,238	149,040	1,685,311	305,533	509,472	306,775	838,716	33,948	96,363	1,416,297	5,360,099	3,943,803
2027	640,674	2,300,891	153,762	1,738,701	315,212	525,612	316,493	865,286	35,024	99,416	1,461,164	5,529,905	4,068,741
Totals	$8,522,156	$30,606,115	$2,045,317	$23,127,943	$4,192,901	$6,991,610	$4,209,945	$11,509,910	$465,878	$1,322,413	$19,436,197	$73,557,992	$54,121,795

TABLE A-10
LOWER AND UPPER ESTIMATES OF TOTAL TRAVEL TIME SAVED
AUTOMOBILES
(person hours)
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	529,194	613,929	540,385	625,120
2011	563,191	653,369	575,101	665,279
2012	597,187	692,809	609,817	705,439
2013	631,184	732,250	644,532	745,598
2014	665,181	771,690	679,248	785,757
2015	699,177	811,130	713,964	825,916
2016	733,174	850,570	748,679	866,076
2017	767,171	890,011	783,395	906,235
2018	801,167	929,451	818,111	946,394
2019	835,164	968,891	852,826	986,553
2020	869,161	1,008,332	887,542	1,026,713
2021	903,158	1,047,772	922,258	1,066,872
2022	937,154	1,087,212	956,973	1,107,031
2023	971,151	1,126,652	991,689	1,147,190
2024	1,005,148	1,166,093	1,026,405	1,187,350
2025	1,039,144	1,205,533	1,061,120	1,227,509
2026	1,073,141	1,244,973	1,095,836	1,267,668
2027	1,107,138	1,284,414	1,130,551	1,307,827
Totals	14,726,984	17,085,081	15,038,431	17,396,528

TABLE A-11
LOWER AND UPPER ESTIMATES OF TOTAL TRAVEL TIME SAVED
TRUCKS
(person hours)
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	39,869	46,253	40,712	47,096
2011	42,430	49,224	43,328	50,122
2012	44,992	52,196	45,943	53,147
2013	47,553	55,167	48,558	56,173
2014	50,114	58,138	51,174	59,198
2015	52,675	61,110	53,789	62,224
2016	55,237	64,081	56,405	65,249
2017	57,798	67,053	59,020	68,275
2018	60,359	70,024	61,636	71,300
2019	62,920	72,995	64,251	74,326
2020	65,482	75,967	66,867	77,352
2021	68,043	78,938	69,482	80,377
2022	70,604	81,910	72,097	83,403
2023	73,166	84,881	74,713	86,428
2024	75,727	87,852	77,328	89,454
2025	78,288	90,824	79,944	92,479
2026	80,849	93,795	82,559	95,505
2027	83,411	96,766	85,175	98,530
Totals	1,109,517	1,287,173	1,132,981	1,310,637

TABLE A-12
ESTIMATES OF THE VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
AUTOMOBILES
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$18,600,127	$22,214,330	$18,993,483	$22,619,279
2011	19,795,044	23,641,433	20,213,671	24,072,396
2012	20,989,961	25,068,535	21,433,858	25,525,514
2013	22,184,879	26,495,638	22,654,045	26,978,631
2014	23,379,796	27,922,740	23,874,233	28,431,748
2015	24,574,713	29,349,842	25,094,420	29,884,866
2016	25,769,630	30,776,945	26,314,608	31,337,983
2017	26,964,548	32,204,047	27,534,795	32,791,100
2018	28,159,465	33,631,150	28,754,982	34,244,218
2019	29,354,382	35,058,252	29,975,170	35,697,335
2020	30,549,299	36,485,355	31,195,357	37,150,452
2021	31,744,217	37,912,457	32,415,545	38,603,570
2022	32,939,134	39,339,559	33,635,732	40,056,687
2023	34,134,051	40,766,662	34,855,919	41,509,804
2024	35,328,968	42,193,764	36,076,107	42,962,922
2025	36,523,886	43,620,867	37,296,294	44,416,039
2026	37,718,803	45,047,969	38,516,481	45,869,156
2027	38,913,720	46,475,072	39,736,669	47,322,273
Total	$ 517,624,624	$ 618,204,618	$ 528,571,368	$ 629,473,973

TABLE A-13
LOWER AND UPPER ESTIMATES OF THE VALUE OF TRAVEL TIME SAVED
TRUCKS
NON-TOLL OPTION

Year	Corridor 5- 4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	$721,628	$837,176	$736,889	$852,437
2011	767,987	890,958	784,229	907,199
2012	814,346	944,740	831,568	961,962
2013	860,705	998,522	878,908	1,016,724
2014	907,065	1,052,304	926,247	1,071,487
2015	953,424	1,106,087	973,587	1,126,250
2016	999,783	1,159,869	1,020,926	1,181,012
2017	1,046,142	1,213,651	1,068,266	1,235,775
2018	1,092,501	1,267,433	1,115,605	1,290,537
2019	1,138,860	1,321,215	1,162,945	1,345,300
2020	1,185,219	1,374,998	1,210,284	1,400,063
2021	1,231,578	1,428,780	1,257,624	1,454,825
2022	1,277,938	1,482,562	1,304,963	1,509,588
2023	1,324,297	1,536,344	1,352,303	1,564,350
2024	1,370,656	1,590,126	1,399,643	1,619,113
2025	1,417,015	1,643,909	1,446,982	1,673,876
2026	1,463,374	1,697,691	1,494,322	1,728,638
2027	1,509,733	1,751,473	1,541,661	1,783,401
Totals	$20,082,251	$23,297,838	$20,506,951	$23,722,538

TABLE A-14
ESTIMATES OF MEAN VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
TOTAL
NON-TOLL OPTION

Year	Corridor 4A-5		Corridor 4A-4	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$19,321,755	$23,051,506	$19,730,372	$23,471,716
2011	20,563,031	24,532,391	20,997,899	24,979,596
2012	21,804,308	26,013,275	22,265,426	26,487,476
2013	23,045,584	27,494,160	23,532,953	27,995,355
2014	24,286,860	28,975,044	24,800,480	29,503,235
2015	25,528,137	30,455,929	26,068,007	31,011,115
2016	26,769,413	31,936,814	27,335,534	32,518,995
2017	28,010,690	33,417,698	28,603,061	34,026,875
2018	29,251,966	34,898,583	29,870,588	35,534,755
2019	30,493,242	36,379,468	31,138,115	37,042,635
2020	31,734,519	37,860,352	32,405,641	38,550,515
2021	32,975,795	39,341,237	33,673,168	40,058,395
2022	34,217,071	40,822,122	34,940,695	41,566,275
2023	35,458,348	42,303,006	36,208,222	43,074,155
2024	36,699,624	43,783,891	37,475,749	44,582,035
2025	37,940,901	45,264,775	38,743,276	46,089,915
2026	39,182,177	46,745,660	40,010,803	47,597,794
2027	40,423,453	48,226,545	41,278,330	49,105,674
Totals	$537,706,875	$641,502,456	$549,078,319	$653,196,511

TABLE A-15
ESTIMATES OF PRESENT VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
TOTAL
NON-TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$15,247,665	$18,190,979	$15,570,123	$18,522,586
2011	$15,165,619	$18,093,095	$15,486,342	$18,422,917
2012	$15,029,050	$17,930,164	$15,346,885	$18,257,016
2013	$14,845,443	$17,711,115	$15,159,395	$18,033,974
2014	$14,621,538	$17,443,988	$14,930,754	$17,761,977
2015	$14,363,392	$17,136,011	$14,667,149	$17,448,387
2016	$14,076,444	$16,793,673	$14,374,133	$17,099,808
2017	$13,765,568	$16,422,787	$14,056,683	$16,722,161
2018	$13,435,122	$16,028,554	$13,719,248	$16,320,741
2019	$13,088,997	$15,615,616	$13,365,804	$15,900,276
2020	$12,730,660	$15,188,107	$12,999,888	$15,464,974
2021	$12,363,189	$14,749,702	$12,624,646	$15,018,576
2022	$11,989,313	$14,303,655	$12,242,863	$14,564,398
2023	$11,611,442	$13,852,843	$11,857,001	$14,105,368
2024	$11,231,700	$13,399,798	$11,469,229	$13,644,065
2025	$10,851,949	$12,946,742	$11,081,447	$13,182,750
2026	$10,473,815	$12,495,615	$10,695,316	$12,723,400
2027	$10,098,712	$12,048,104	$10,312,280	$12,267,731
Totals	$234,989,618	$280,350,548	$239,959,187	$285,461,104

TABLE A-16
MIDYEAR DISCOUNT FACTOR

Year	Interest Rate (7%)	Discount Factor
2007	1.0344	0.9667
2008	1.1068	0.9035
2009	1.1843	0.8444
2010	1.2672	0.7891
2011	1.3559	0.7375
2012	1.4508	0.6893
2013	1.5524	0.6442
2014	1.6610	0.6020
2015	1.7773	0.5626
2016	1.9017	0.5258
2017	2.0348	0.4914
2018	2.1773	0.4593
2019	2.3297	0.4292
2020	2.4928	0.4012
2021	2.6673	0.3749
2022	2.8540	0.3504
2023	3.0537	0.3275
2024	3.2675	0.3060
2025	3.4962	0.2860
2026	3.7410	0.2673
2027	4.0028	0.2498

APPENDIX B

REPORT TABLES FOR TOLL OPTION ECONOMIC IMPACT CALCULATIONS

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TABLE B-1

TABLE 4
PROJECTED DAILY TRAFFIC VOLUMES
CORRIDORS 5-4A and 4-4A
TOLL OPTION

Year	Average Daily Traffic	Year	Average Daily Traffic
2010	6,750	2019	11,160
2011	7,240	2020	11,650
2012	7,730	2021	12,140
2013	8,220	2022	12,630
2014	8,710	2023	13,120
2015	9,200	2024	13,610
2016	9,690	2025	14,100
2017	10,180	2026	14,590
2018	10,670	2027	15,080

Source: CH2MHill

TABLE B-2

TABLE 5
DIVERTED SALES AND GROSS PROFIT ON THOSE SALES
BUSINESSES IN CAVE SPRINGS, ELM SPRINGS AND LOWELL
CORRIDORS 5-4A and 4-4A
2007 dollars
TOLL-OPTION

Year	Sales		Gross Profit	
	Nominal Dollars	Present Value	Nominal Dollars	Present Value
2010	$181,991	$143,617	$40,766	$32,170
2011	195,202	143,965	43,725	32,248
2012	208,413	143,653	46,685	32,178
2013	221,624	142,765	49,644	31,979
2014	234,835	141,379	52,603	31,669
2015	248,047	139,563	55,562	31,262
2016	261,258	137,380	58,522	30,773
2017	274,469	134,885	61,481	30,214
2018	287,680	132,128	64,440	29,597
2019	300,891	129,155	67,400	28,931
2020	314,102	126,006	70,359	28,225
2021	327,314	122,715	73,318	27,488
2022	340,525	119,316	76,278	26,727
2023	353,736	115,837	79,237	25,947
2024	366,947	112,302	82,196	25,156
2025	380,158	108,734	85,155	24,356
2026	393,369	105,152	88,115	23,554
2027	406,581	101,573	91,074	22,752
Totals	$5,297,142	$2,300,127	$1,186,560	$515,228

TABLE B-3

TABLE 8
SUMMARY
TRAVELERS' WILLINGNESS TO PAY
TO REDUCE CRASH LOSSES
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Cost Reduction	Present Value of Cost Reduction	Cost Reduction	Present Value of Cost Reduction
2010	$1,581,284	$1,247,863	$1,591,194	$1,255,682
2011	1,696,074	1,250,886	1,706,702	1,258,725
2012	1,810,863	1,248,173	1,822,211	1,255,995
2013	1,925,653	1,240,462	1,937,720	1,248,235
2014	2,040,442	1,228,418	2,053,229	1,236,115
2015	2,155,232	1,212,640	2,168,738	1,220,239
2016	2,270,022	1,193,669	2,284,247	1,201,150
2017	2,384,811	1,171,991	2,399,756	1,179,335
2018	2,499,601	1,148,040	2,515,264	1,155,235
2019	2,614,390	1,122,208	2,630,773	1,129,240
2020	2,729,180	1,094,841	2,746,282	1,101,702
2021	2,843,969	1,066,253	2,861,791	1,072,934
2022	2,958,759	1,036,719	2,977,300	1,043,215
2023	3,073,548	1,006,486	3,092,809	1,012,793
2024	3,188,338	975,772	3,208,318	981,886
2025	3,303,127	944,769	3,323,826	950,689
2026	3,417,917	913,646	3,439,335	919,371
2027	3,532,706	882,552	3,554,844	888,082
Totals	$46,025,916	$19,985,386	$46,314,339	$20,110,625

TABLE B-4

TABLE 10
ESTIMATED TOTAL TRAVEL TIMES
(vehicle hours)
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Present Route	Proposed Route	Present Route	Proposed Route
2010	627,024	333,428	627,024	327,679
2011	672,542	357,632	672,542	351,466
2012	718,059	381,836	718,059	375,253
2013	763,576	406,041	763,576	399,040
2014	809,094	430,245	809,094	422,827
2015	854,611	454,449	854,611	446,614
2016	900,128	478,654	900,128	470,401
2017	945,646	502,858	945,646	494,188
2018	991,163	527,062	991,163	517,975
2019	1,036,680	551,267	1,036,680	541,762
2020	1,082,198	575,471	1,082,198	565,549
2021	1,127,715	599,676	1,127,715	589,336
2022	1,173,232	623,880	1,173,232	613,123
2023	1,218,750	648,084	1,218,750	636,910
2024	1,264,267	672,289	1,264,267	660,697
2025	1,309,784	696,493	1,309,784	684,485
2026	1,355,302	720,697	1,355,302	708,272
2027	1,400,819	744,902	1,400,819	732,059
Totals	18,250,589	9,704,963	18,250,589	9,537,636

TABLE B-5

TABLE 11
LOWER AND UPPER ESTIMATES OF TOTAL TRAVEL TIMES
ALTERNATIVE CORRIDOR INTERSECTION WITH I-540 TO XNA VIA PRESENT ROUTE
(vehicle hours)
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	605,261	648,788	605,261	648,788
2011	649,199	695,885	649,199	695,885
2012	693,136	742,982	693,136	742,982
2013	737,074	790,079	737,074	790,079
2014	781,011	837,176	781,011	837,176
2015	824,949	884,273	824,949	884,273
2016	868,886	931,371	868,886	931,371
2017	912,824	978,468	912,824	978,468
2018	956,761	1,025,565	956,761	1,025,565
2019	1,000,699	1,072,662	1,000,699	1,072,662
2020	1,044,636	1,119,759	1,044,636	1,119,759
2021	1,088,574	1,166,856	1,088,574	1,166,856
2022	1,132,511	1,213,954	1,132,511	1,213,954
2023	1,176,449	1,261,051	1,176,449	1,261,051
2024	1,220,386	1,308,148	1,220,386	1,308,148
2025	1,264,324	1,355,245	1,264,324	1,355,245
2026	1,308,261	1,402,342	1,308,261	1,402,342
2027	1,352,198	1,449,439	1,352,198	1,449,439
Totals	17,617,137	18,884,042	17,617,137	18,884,042

TABLE B-6

TABLE 12
ESTIMATED TOTAL TRAVEL TIME SAVED
(person hours)
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Autos	Trucks	Autos	Trucks
2010	480,559	35,232	489,969	35,921
2011	515,444	37,789	525,537	38,529
2012	550,329	40,347	561,105	41,137
2013	585,215	42,904	596,673	43,744
2014	620,100	45,462	632,241	46,352
2015	654,985	48,019	667,809	48,960
2016	689,870	50,577	703,378	51,567
2017	724,755	53,135	738,946	54,175
2018	759,640	55,692	774,514	56,783
2019	794,525	58,250	810,082	59,390
2020	829,410	60,807	845,650	61,998
2021	864,295	63,365	881,218	64,605
2022	899,180	65,922	916,786	67,213
2023	934,065	68,480	952,354	69,821
2024	968,950	71,037	987,923	72,428
2025	1,003,835	73,595	1,023,491	75,036
2026	1,038,720	76,153	1,059,059	77,644
2027	1,073,605	78,710	1,094,627	80,251
Totals	13,987,481	1,025,475	14,261,362	1,045,554

TABLE B-7

TABLE 13
VALUE OF SAVED TRAVEL TIME
TOLL OPTION

Year	Corridor 5-4A-5	Corridor 4-4A
2010	$17,316,562	$17,655,628
2011	18,573,617	18,937,296
2012	19,830,671	20,218,964
2013	21,087,725	21,500,631
2014	22,344,779	22,782,299
2015	23,601,833	24,063,967
2016	24,858,887	25,345,635
2017	26,115,942	26,627,303
2018	27,372,996	27,908,970
2019	28,630,050	29,190,638
2020	29,887,104	30,472,306
2021	31,144,158	31,753,974
2022	32,401,212	33,035,642
2023	33,658,266	34,317,309
2024	34,915,321	35,598,977
2025	36,172,375	36,880,645
2026	37,429,429	38,162,313
2027	38,686,483	39,443,981
Totals	$504,027,410	$513,896,478

TABLE B-8

TABLE 14
PRESENT VALUE OF SAVED TRAVEL TIME
TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$13,665,278	$13,932,850
2011	$13,698,388	$13,966,609
2012	$13,668,682	$13,936,320
2013	$13,584,235	$13,850,220
2014	$13,452,337	$13,715,739
2015	$13,279,558	$13,539,578
2016	$13,071,812	$13,327,764
2017	$12,834,413	$13,085,717
2018	$12,572,131	$12,818,298
2019	$12,289,236	$12,529,864
2020	$11,989,549	$12,224,309
2021	$11,676,477	$11,905,107
2022	$11,353,054	$11,575,352
2023	$11,021,975	$11,237,790
2024	$10,685,625	$10,894,854
2025	$10,346,111	$10,548,692
2026	$10,005,287	$10,201,194
2027	$9,664,776	$9,854,017
Totals	$218,858,923	$223,144,272

TABLE B-9

TABLE 15
TOTAL TRAVEL MILES SAVED ANNUALLY
TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	5,173,875	5,543,438
2011	5,549,460	5,945,850
2012	5,925,045	6,348,263
2013	6,300,630	6,750,675
2014	6,676,215	7,153,088
2015	7,051,800	7,555,500
2016	7,427,385	7,957,913
2017	7,802,970	8,360,325
2018	8,178,555	8,762,738
2019	8,554,140	9,165,150
2020	8,929,725	9,567,563
2021	9,305,310	9,969,975
2022	9,680,895	10,372,388
2023	10,056,480	10,774,800
2024	10,432,065	11,177,213
2025	10,807,650	11,579,625
2026	11,183,235	11,982,038
2027	11,558,820	12,384,450
Totals	150,594,255	161,350,988

TABLE B-10

TABLE 16
AUTOMOBILE OPERATING COST SAVINGS
TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$678,398	$726,856
2011	727,645	779,620
2012	776,892	832,384
2013	826,139	885,149
2014	875,385	937,913
2015	924,632	990,677
2016	973,879	1,043,441
2017	1,023,125	1,096,206
2018	1,072,372	1,148,970
2019	1,121,619	1,201,734
2020	1,170,866	1,254,499
2021	1,220,112	1,307,263
2022	1,269,359	1,360,027
2023	1,318,606	1,412,792
2024	1,367,852	1,465,556
2025	1,417,099	1,518,320
2026	1,466,346	1,571,085
2027	1,515,592	1,623,849
Totals	$19,745,919	$21,156,341

TABLE B-11

TABLE 17
TRUCK OPERATING COST SAVINGS
TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$1,643,678	$1,761,084
2011	1,762,997	1,888,925
2012	1,882,316	2,016,767
2013	2,001,635	2,144,608
2014	2,120,953	2,272,450
2015	2,240,272	2,400,292
2016	2,359,591	2,528,133
2017	2,478,910	2,655,975
2018	2,598,229	2,783,817
2019	2,717,548	2,911,658
2020	2,836,866	3,039,500
2021	2,956,185	3,167,341
2022	3,075,504	3,295,183
2023	3,194,823	3,423,025
2024	3,314,142	3,550,866
2025	3,433,461	3,678,708
2026	3,552,780	3,806,550
2027	3,672,098	3,934,391
Totals	$47,841,988	$51,259,273

TABLE B-12

TABLE 18
PRESENT VALUE
AUTOMOBILE AND TRUCK OPERATING COST SAVINGS
TOLL OPTION

Year	Corridor 5-4A	Corridor 4-4A
2010	$1,832,455	$1,963,345
2011	1,836,895	1,968,102
2012	1,832,911	1,963,834
2013	1,821,587	1,951,701
2014	1,803,900	1,932,751
2015	1,780,732	1,907,927
2016	1,752,874	1,878,079
2017	1,721,040	1,843,971
2018	1,685,869	1,806,288
2019	1,647,934	1,765,643
2020	1,607,747	1,722,586
2021	1,565,765	1,677,606
2022	1,522,396	1,631,138
2023	1,477,999	1,583,571
2024	1,432,896	1,535,246
2025	1,387,369	1,486,467
2026	1,341,666	1,437,499
2027	1,296,005	1,388,577
Totals	$29,348,040	$31,444,328

TABLE B-13

TABLE 19
QUANTIFIED ECONOMIC IMPACT SUMMARY
CORRIDOR 5-4A
TOLL OPTION

Year	Positive Impacts			Negative Impacts		Total Economic Impact
	Crash Reduction	Time Savings	Operating Costs Savings	Government Tax Revenues	Traffic Diversion	
2008				$176,463		($176,463)
2009				$352,927		($352,927)
2010	$1,581,284	$17,316,562	$2,322,076	$352,927	$40,766	20,826,230
2011	1,696,074	18,573,617	2,490,642	$352,927	43,725	22,363,680
2012	1,810,863	19,830,671	2,659,208	$352,927	46,685	23,901,130
2013	1,925,653	21,087,725	2,827,773	$352,927	49,644	25,438,580
2014	2,040,442	22,344,779	2,996,339	$352,927	52,603	26,976,030
2015	2,155,232	23,601,833	3,164,904	$352,927	55,562	28,513,480
2016	2,270,022	24,858,887	3,333,470	$352,927	58,522	30,050,930
2017	2,384,811	26,115,942	3,502,035	$352,927	61,481	31,588,380
2018	2,499,601	27,372,996	3,670,601	$352,927	64,440	33,125,830
2019	2,614,390	28,630,050	3,839,166	$352,927	67,400	34,663,280
2020	2,729,180	29,887,104	4,007,732	$352,927	70,359	36,200,730
2021	2,843,969	31,144,158	4,176,298	$352,927	73,318	37,738,180
2022	2,958,759	32,401,212	4,344,863	$352,927	76,278	39,275,630
2023	3,073,548	33,658,266	4,513,429	$352,927	79,237	40,813,080
2024	3,188,338	34,915,321	4,681,994	$352,927	82,196	42,350,530
2025	3,303,127	36,172,375	4,850,560	$352,927	85,155	43,887,980
2026	3,417,917	37,429,429	5,019,125	$352,927	88,115	45,425,429
2027	3,532,706	38,686,483	5,187,691	$352,927	91,074	46,962,879
Totals	$46,025,916	$504,027,410	$67,587,906	$6,705,611	$1,186,560	$609,749,061

TABLE B-14

TABLE 20
QUANTIFIED ECONOMIC IMPACT SUMMARY
CORRIDOR 4-4A
TOLL OPTION

Year	Positive Impacts			Negative Impacts		Total Economic Impact
	Crash Reduction	Time Savings	Operating Costs Savings	Government Tax Revenues	Traffic Diversion	
2008				$170,252		($170,252)
2009				340,505		($340,505)
2010	$1,591,194	$17,655,628	$2,487,939	340,505	$40,766	21,353,490
2011	1,706,702	18,937,296	2,668,545	340,505	43,725	22,928,313
2012	1,822,211	20,218,964	2,849,151	340,505	46,685	24,503,137
2013	1,937,720	21,500,631	3,029,757	340,505	49,644	26,077,960
2014	2,053,229	22,782,299	3,210,363	340,505	52,603	27,652,783
2015	2,168,738	24,063,967	3,390,969	340,505	55,562	29,227,606
2016	2,284,247	25,345,635	3,571,575	340,505	58,522	30,802,430
2017	2,399,756	26,627,303	3,752,181	340,505	61,481	32,377,253
2018	2,515,264	27,908,970	3,932,787	340,505	64,440	33,952,076
2019	2,630,773	29,190,638	4,113,393	340,505	67,400	35,526,900
2020	2,746,282	30,472,306	4,293,999	340,505	70,359	37,101,723
2021	2,861,791	31,753,974	4,474,605	340,505	73,318	38,676,546
2022	2,977,300	33,035,642	4,655,210	340,505	76,278	40,251,370
2023	3,092,809	34,317,309	4,835,816	340,505	79,237	41,826,193
2024	3,208,318	35,598,977	5,016,422	340,505	82,196	43,401,016
2025	3,323,826	36,880,645	5,197,028	340,505	85,155	44,975,840
2026	3,439,335	38,162,313	5,377,634	340,505	88,115	46,550,663
2027	3,554,844	39,443,981	5,558,240	340,505	91,074	48,125,486
Totals	$46,314,339	$513,896,478	$72,415,614	$6,469,590	$1,186,560	$624,970,281

TABLE B-15

TABLE 21
PRESENT VALUE
TOTAL QUANTIFIED ECONOMIC IMPACT
TOLL OPTION

	Corridor	
Year	5-4A	4-4A
2008	($159,433)	($153,822)
2009	($298,006)	($287,517)
2010	$16,434,914	$16,850,999
2011	$16,493,631	$16,910,058
2012	$16,474,326	$16,889,271
2013	$16,386,957	$16,798,831
2014	$16,240,512	$16,647,941
2015	$16,043,094	$16,444,896
2016	$15,801,999	$16,197,168
2017	$15,523,787	$15,911,471
2018	$15,214,347	$15,593,834
2019	$14,878,955	$15,249,657
2020	$14,522,331	$14,883,774
2021	$14,148,688	$14,500,498
2022	$13,761,780	$14,103,669
2023	$13,364,941	$13,696,702
2024	$12,961,126	$13,282,621
2025	$12,552,947	$12,864,100
2026	$12,142,703	$12,443,490
2027	$11,732,411	$12,022,857
Totals	$264,222,010	$270,850,499

TABLE B-16

TABLE 22
RIGHT OF WAY ACQUISITION COSTS, CONSTRUCTION, AND OPERATIONS AND MAINTENACE COSTS
TOLL OPTION

Year	Corridor 5-4A			Corridor 4-4A		
	Right of Way	Construction	Operations and Maintenance	Right of Way	Construction	Operations and Maintenance
2007	$38,346,000			$38,346,000		
2008		$27,348,369			$27,096,369	
2009		$27,348,369			$27,096,369	
2010			$337,011			$336,602
2011			$337,011			$336,602
2012			$337,011			$336,602
2013			$337,011			$336,602
2014			$337,011			$336,602
2015			$337,011			$336,602
2016			$337,011			$336,602
2017			$337,011			$336,602
2018			$337,011			$336,602
2019			$337,011			$336,602
2020			$337,011			$336,602
2021			$337,011			$336,602
2022			$337,011			$336,602
2023			$337,011			$336,602
2024			$337,011			$336,602
2025			$337,011			$336,602
2026			$337,011			$336,602
2027			$337,011			$336,602
Totals	$38,346,000	$54,696,738	$6,066,198	$38,346,000	$54,192,738	$6,058,836

Source: CH2MHill

TABLE B-17

TABLE 23
PRESENT VALUE
RIGHT OF WAY ACQUISTION,
CONSTRUCTION, AND OPERATIONS AND MAINTENACE COSTS
TOLL OPTION

Year	Corridor 5-4A			Corridor 4-4A		
	Right of Way	Construction	Operations and Maintenance	Right of Way	Construction	Operations and Maintenance
2007	$37,070,477			$37,070,477		
2008		$24,709,034			$24,481,354	
2009		$23,092,555			$22,879,770	
2010			$265,951			$265,628
2011			$248,552			$248,250
2012			$232,291			$232,010
2013			$217,095			$216,831
2014			$202,892			$202,646
2015			$189,619			$189,389
2016			$177,214			$176,999
2017			$165,621			$165,420
2018			$154,786			$154,598
2019			$144,659			$144,484
2020			$135,196			$135,032
2021			$126,351			$126,198
2022			$118,085			$117,942
2023			$110,360			$110,226
2024			$103,140			$103,015
2025			$96,393			$96,276
2026			$90,087			$89,977
2027			$84,193			$84,091
Totals	$37,070,477	$47,801,589	$2,862,485	$37,070,477	$47,361,124	$2,859,011

TABLE B-18

TABLE 24
SUMMARY OF QUANTIFIED ECONOMIC IMPACTS AND COSTS
TOLL OPTION

Year	Corridor 5-4A			Corridor 4-4A		
	Total Economic Impact	Project Cost	Net Impact	Total Economic Impact	Project Cost	Net Impact
2007		$38,346,000	($38,346,000)		$38,346,000	($38,346,000)
2008	($176,463)	$27,348,369	(27,524,832)	($170,252)	$27,096,369	(27,266,621)
2009	(352,927)	$27,348,369	(27,701,296)	(340,505)	$27,096,369	(27,436,874)
2010	20,826,230	$337,011	20,489,219	21,353,490	$336,602	21,016,888
2011	22,363,680	$337,011	22,026,669	22,928,313	$336,602	22,591,711
2012	23,901,130	$337,011	23,564,119	24,503,137	$336,602	24,166,535
2013	25,438,580	$337,011	25,101,569	26,077,960	$336,602	25,741,358
2014	26,976,030	$337,011	26,639,019	27,652,783	$336,602	27,316,181
2015	28,513,480	$337,011	28,176,469	29,227,606	$336,602	28,891,004
2016	30,050,930	$337,011	29,713,919	30,802,430	$336,602	30,465,828
2017	31,588,380	$337,011	31,251,369	32,377,253	$336,602	32,040,651
2018	33,125,830	$337,011	32,788,819	33,952,076	$336,602	33,615,474
2019	34,663,280	$337,011	34,326,269	35,526,900	$336,602	35,190,298
2020	36,200,730	$337,011	35,863,719	37,101,723	$336,602	36,765,121
2021	37,738,180	$337,011	37,401,169	38,676,546	$336,602	38,339,944
2022	39,275,630	$337,011	38,938,619	40,251,370	$336,602	39,914,768
2023	40,813,080	$337,011	40,476,069	41,826,193	$336,602	41,489,591
2024	42,350,530	$337,011	42,013,519	43,401,016	$336,602	43,064,414
2025	43,887,980	$337,011	43,550,969	44,975,840	$336,602	44,639,238
2026	45,425,429	$337,011	45,088,418	46,550,663	$336,602	46,214,061
2027	46,962,879	$337,011	46,625,868	48,125,486	$336,602	47,788,884
Totals	$609,572,598	$99,108,936	$510,463,662	$624,800,029	$98,597,574	$526,202,455

TABLE B-19

TABLE 25
NET QUANTIFIED ECONOMIC IMPACT
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Net Quantified Economic Impact	Present Value of Net Impact	Net Quantified Economic Impact	Present Value of Net Impact
2007	($38,346,000)	($37,070,477)	($38,346,000)	($37,070,477)
2008	(27,524,832)	($24,868,467)	(27,266,621)	($24,635,176)
2009	(27,701,296)	($23,390,561)	(27,436,874)	($23,167,287)
2010	20,489,219	$16,168,964	21,016,888	$16,585,371
2011	22,026,669	$16,245,079	22,591,711	$16,661,808
2012	23,564,119	$16,242,035	24,166,535	$16,657,261
2013	25,101,569	$16,169,862	25,741,358	$16,581,999
2014	26,639,019	$16,037,619	27,316,181	$16,445,294
2015	28,176,469	$15,853,475	28,891,004	$16,255,507
2016	29,713,919	$15,624,785	30,465,828	$16,020,169
2017	31,251,369	$15,358,167	32,040,651	$15,746,051
2018	32,788,819	$15,059,562	33,615,474	$15,439,236
2019	34,326,269	$14,734,296	35,190,298	$15,105,174
2020	35,863,719	$14,387,135	36,765,121	$14,748,743
2021	37,401,169	$14,022,337	38,339,944	$14,374,300
2022	38,938,619	$13,643,695	39,914,768	$13,985,727
2023	40,476,069	$13,254,581	41,489,591	$13,586,476
2024	42,013,519	$12,857,986	43,064,414	$13,179,606
2025	43,550,969	$12,456,554	44,639,238	$12,767,824
2026	45,088,418	$12,052,616	46,214,061	$12,353,513
2027	46,625,868	$11,648,218	47,788,884	$11,938,766
Totals	$510,463,662	$176,487,459	$526,202,455	$183,559,886

APPENDIX C

SUPPORTING TABLES FOR TOLL OPTION

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TABLE C-1

TABLE A-4
PROJECTED ANNUAL MILES TRAVELED ON ALTERNATIVE CORRIDORS
and
MILES SAVED WHEN COMPARED TO CURRENT ROUTE
TOLL OPTION

	Corridor 4A-5			Corridor 4A-4		
		Annual Miles			Annual Miles	
Year	Daily Traffic Volume	Traveled on Proposed Route	Travel Miles Saved	Daily Traffic Volume	Traveled on Proposed Route	Travel Miles Saved
2010	6,750	21,681,000	5,173,875	6,750	21,311,438	5,543,438
2011	7,240	23,254,880	5,549,460	7,240	22,858,490	5,945,850
2012	7,730	24,828,760	5,925,045	7,730	24,405,543	6,348,263
2013	8,220	26,402,640	6,300,630	8,220	25,952,595	6,750,675
2014	8,710	27,976,520	6,676,215	8,710	27,499,648	7,153,088
2015	9,200	29,550,400	7,051,800	9,200	29,046,700	7,555,500
2016	9,690	31,124,280	7,427,385	9,690	30,593,753	7,957,913
2017	10,180	32,698,160	7,802,970	10,180	32,140,805	8,360,325
2018	10,670	34,272,040	8,178,555	10,670	33,687,858	8,762,738
2019	11,160	35,845,920	8,554,140	11,160	35,234,910	9,165,150
2020	11,650	37,419,800	8,929,725	11,650	36,781,963	9,567,563
2021	12,140	38,993,680	9,305,310	12,140	38,329,015	9,969,975
2022	12,630	40,567,560	9,680,895	12,630	39,876,068	10,372,388
2023	13,120	42,141,440	10,056,480	13,120	41,423,120	10,774,800
2024	13,610	43,715,320	10,432,065	13,610	42,970,173	11,177,213
2025	14,100	45,289,200	10,807,650	14,100	44,517,225	11,579,625
2026	14,590	46,863,080	11,183,235	14,590	46,064,278	11,982,038
2027	15,080	48,436,960	11,558,820	15,080	47,611,330	12,384,450
Totals		631,061,640	150,594,255		620,304,908	161,350,988

TABLE C-2

TABLE A-5
EXPECTED ANNUAL NUMBER OF CRASHES AND THEIR OUTCOMES
CORRIDOR 5-4A
TOLL OPTION

Year	Number of Crashes		Crash Outcomes									
			Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only	
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route
2010	13	33	0.08	0.30	0.34	3.78	3.48	5.71	6.63	17.81	6.97	19.44
2011	13	36	0.09	0.32	0.36	4.05	3.74	6.12	7.11	19.10	7.47	20.85
2012	14	38	0.10	0.34	0.39	4.33	3.99	6.54	7.59	20.40	7.98	22.26
2013	15	41	0.10	0.37	0.41	4.60	4.24	6.95	8.07	21.69	8.48	23.67
2014	16	43	0.11	0.39	0.44	4.87	4.50	7.37	8.55	22.98	8.99	25.08
2015	17	45	0.12	0.41	0.46	5.15	4.75	7.78	9.03	24.27	9.50	26.50
2016	18	48	0.12	0.43	0.49	5.42	5.00	8.20	9.51	25.57	10.00	27.91
2017	19	50	0.13	0.45	0.51	5.70	5.25	8.61	10.00	26.86	10.51	29.32
2018	20	53	0.13	0.47	0.54	5.97	5.51	9.03	10.48	28.15	11.01	30.73
2019	21	55	0.14	0.50	0.56	6.25	5.76	9.44	10.96	29.45	11.52	32.14
2020	22	58	0.15	0.52	0.59	6.52	6.01	9.85	11.44	30.74	12.02	33.55
2021	23	60	0.15	0.54	0.61	6.79	6.27	10.27	11.92	32.03	12.53	34.96
2022	24	62	0.16	0.56	0.64	7.07	6.52	10.68	12.40	33.32	13.04	36.37
2023	24	65	0.17	0.58	0.66	7.34	6.77	11.10	12.88	34.62	13.54	37.78
2024	25	67	0.17	0.60	0.69	7.62	7.02	11.51	13.36	35.91	14.05	39.20
2025	26	70	0.18	0.63	0.71	7.89	7.28	11.93	13.84	37.20	14.55	40.61
2026	27	72	0.18	0.65	0.73	8.17	7.53	12.34	14.32	38.50	15.06	42.02
2027	28	75	0.19	0.67	0.76	8.44	7.78	12.76	14.81	39.79	15.57	43.43
Total	366	971	2	9	10	110	101	166	193	518	203	566

TABLE C-3

TABLE A-6
EXPECTED ANNUAL NUMBER OF CRASHES AND THEIR OUTCOMES
CORRIDOR 4-4A
TOLL OPTION

Year	Number of Crashes		Crash Outcomes									
			Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only	
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route
2010	12	33	0.08	0.30	0.33	3.78	3.42	5.71	6.51	17.81	6.85	19.44
2011	13	36	0.09	0.32	0.36	4.05	3.67	6.12	6.99	19.10	7.35	20.85
2012	14	38	0.10	0.34	0.38	4.33	3.92	6.54	7.46	20.40	7.84	22.26
2013	15	41	0.10	0.37	0.41	4.60	4.17	6.95	7.93	21.69	8.34	23.67
2014	16	43	0.11	0.39	0.43	4.87	4.42	7.37	8.41	22.98	8.84	25.08
2015	17	45	0.11	0.41	0.46	5.15	4.67	7.78	8.88	24.27	9.33	26.50
2016	18	48	0.12	0.43	0.48	5.42	4.92	8.20	9.35	25.57	9.83	27.91
2017	19	50	0.13	0.45	0.50	5.70	5.16	8.61	9.82	26.86	10.33	29.32
2018	20	53	0.13	0.47	0.53	5.97	5.41	9.03	10.30	28.15	10.83	30.73
2019	20	55	0.14	0.50	0.55	6.25	5.66	9.44	10.77	29.45	11.32	32.14
2020	21	58	0.14	0.52	0.58	6.52	5.91	9.85	11.24	30.74	11.82	33.55
2021	22	60	0.15	0.54	0.60	6.79	6.16	10.27	11.72	32.03	12.32	34.96
2022	23	62	0.16	0.56	0.63	7.07	6.41	10.68	12.19	33.32	12.81	36.37
2023	24	65	0.16	0.58	0.65	7.34	6.66	11.10	12.66	34.62	13.31	37.78
2024	25	67	0.17	0.60	0.67	7.62	6.90	11.51	13.13	35.91	13.81	39.20
2025	26	70	0.17	0.63	0.70	7.89	7.15	11.93	13.61	37.20	14.31	40.61
2026	27	72	0.18	0.65	0.72	8.17	7.40	12.34	14.08	38.50	14.80	42.02
2027	28	75	0.19	0.67	0.75	8.44	7.65	12.76	14.55	39.79	15.30	43.43
Total	360	971	2	9	10	110	100	166	190	518	199	566

TABLE C-4

TABLE A-8
TRAVELERS WILLINGNESS TO PAY TO REDUCE CRASH LOSSES
CORRIDOR 5-4A
TOLL OPTION

Year	Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only		Total		Reduction in Crash Losses
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	
2010	$254,898	$899,827	$61,176	$679,967	$125,410	$205,555	$125,920	$338,394	$13,934	$38,879	$581,338	$2,162,622	$1,581,284
2011	273,402	965,148	65,616	729,328	134,514	220,477	135,061	362,959	14,946	41,702	623,539	2,319,613	1,696,074
2012	291,906	1,030,469	70,057	778,688	143,618	235,399	144,201	387,524	15,958	44,524	665,740	2,476,603	1,810,863
2013	310,409	1,095,789	74,498	828,049	152,721	250,320	153,342	412,089	16,969	47,346	707,940	2,633,593	1,925,653
2014	328,913	1,161,110	78,939	877,409	161,825	265,242	162,483	436,654	17,981	50,169	750,141	2,790,584	2,040,442
2015	347,417	1,226,431	83,380	926,770	170,929	280,164	171,624	461,219	18,992	52,991	792,342	2,947,574	2,155,232
2016	365,921	1,291,752	87,821	976,130	180,033	295,086	180,765	485,783	20,004	55,813	834,543	3,104,564	2,270,022
2017	384,424	1,357,072	92,262	1,025,491	189,137	310,007	189,906	510,348	21,015	58,636	876,744	3,261,555	2,384,811
2018	402,928	1,422,393	96,703	1,074,852	198,241	324,929	199,046	534,913	22,027	61,458	918,945	3,418,545	2,499,601
2019	421,432	1,487,714	101,144	1,124,212	207,344	339,851	208,187	559,478	23,038	64,280	961,145	3,575,535	2,614,390
2020	439,935	1,553,035	105,585	1,173,573	216,448	354,773	217,328	584,043	24,050	67,103	1,003,346	3,732,526	2,729,180
2021	458,439	1,618,356	110,025	1,222,933	225,552	369,694	226,469	608,608	25,061	69,925	1,045,547	3,889,516	2,843,969
2022	476,943	1,683,676	114,466	1,272,294	234,656	384,616	235,610	633,173	26,073	72,747	1,087,748	4,046,507	2,958,759
2023	495,447	1,748,997	118,907	1,321,654	243,760	399,538	244,751	657,738	27,084	75,570	1,129,949	4,203,497	3,073,548
2024	513,950	1,814,318	123,348	1,371,015	252,864	414,460	253,891	682,303	28,096	78,392	1,172,150	4,360,487	3,188,338
2025	532,454	1,879,639	127,789	1,420,375	261,967	429,382	263,032	706,868	29,107	81,214	1,214,350	4,517,478	3,303,127
2026	550,958	1,944,959	132,230	1,469,736	271,071	444,303	272,173	731,433	30,119	84,037	1,256,551	4,674,468	3,417,917
2027	569,462	2,010,280	136,671	1,519,097	280,175	459,225	281,314	755,997	31,131	86,859	1,298,752	4,831,458	3,532,706
Totals	$7,419,238	$26,190,964	$1,780,617	$19,791,572	$3,650,265	$5,983,020	$3,665,104	$9,849,523	$405,585	$1,131,645	$16,920,809	$62,946,725	$46,025,916

TABLE C-5

TABLE A-9
TRAVELERS WILLINGNESS TO PAY TO REDUCE CRASH LOSSES
CORRIDOR 4-4A
TOLL OPTION

Year	Fatalities		Incapacitating Injury		Evident Injury		Possible Injury		Property Damage Only		Total		Reduction in Crash Losses
	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	Access Road	Current Route	
2010	$250,553	$899,827	$60,133	$679,967	$123,272	$205,555	$123,773	$338,394	$13,697	$38,879	$571,429	$2,162,622	$1,591,194
2011	268,742	965,148	64,498	729,328	132,221	220,477	132,758	362,959	14,691	41,702	612,910	2,319,613	1,706,702
2012	286,930	1,030,469	68,863	778,688	141,170	235,399	141,743	387,524	15,686	44,524	654,392	2,476,603	1,822,211
2013	305,118	1,095,789	73,228	828,049	150,118	250,320	150,728	412,089	16,680	47,346	695,873	2,633,593	1,937,720
2014	323,307	1,161,110	77,594	877,409	159,067	265,242	159,713	436,654	17,674	50,169	737,355	2,790,584	2,053,229
2015	341,495	1,226,431	81,959	926,770	168,016	280,164	168,699	461,219	18,668	52,991	778,836	2,947,574	2,168,738
2016	359,683	1,291,752	86,324	976,130	176,964	295,086	177,684	485,783	19,663	55,813	820,318	3,104,564	2,284,247
2017	377,872	1,357,072	90,689	1,025,491	185,913	310,007	186,669	510,348	20,657	58,636	861,799	3,261,555	2,399,756
2018	396,060	1,422,393	95,054	1,074,852	194,861	324,929	195,654	534,913	21,651	61,458	903,281	3,418,545	2,515,264
2019	414,248	1,487,714	99,420	1,124,212	203,810	339,851	204,639	559,478	22,646	64,280	944,762	3,575,535	2,630,773
2020	432,437	1,553,035	103,785	1,173,573	212,759	354,773	213,624	584,043	23,640	67,103	986,244	3,732,526	2,746,282
2021	450,625	1,618,356	108,150	1,222,933	221,707	369,694	222,609	608,608	24,634	69,925	1,027,725	3,889,516	2,861,791
2022	468,813	1,683,676	112,515	1,272,294	230,656	384,616	231,594	633,173	25,628	72,747	1,069,207	4,046,507	2,977,300
2023	487,002	1,748,997	116,880	1,321,654	239,605	399,538	240,579	657,738	26,623	75,570	1,110,688	4,203,497	3,092,809
2024	505,190	1,814,318	121,246	1,371,015	248,553	414,460	249,564	682,303	27,617	78,392	1,152,170	4,360,487	3,208,318
2025	523,378	1,879,639	125,611	1,420,375	257,502	429,382	258,549	706,868	28,611	81,214	1,193,651	4,517,478	3,323,826
2026	541,567	1,944,959	129,976	1,469,736	266,451	444,303	267,534	731,433	29,606	84,037	1,235,133	4,674,468	3,439,335
2027	559,755	2,010,280	134,341	1,519,097	275,399	459,225	276,519	755,997	30,600	86,859	1,276,614	4,831,458	3,554,844
Totals	$7,292,774	$26,190,964	$1,750,266	$19,791,572	$3,588,045	$5,983,020	$3,602,630	$9,849,523	$398,672	$1,131,645	$16,632,386	$62,946,725	$46,314,339

TABLE C-6

TABLE A-10
LOWER AND UPPER ESTIMATES OF TOTAL TRAVEL TIME SAVED
AUTOMOBILES
(person hours)
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	432,977	502,305	442,133	511,462
2011	464,408	538,769	474,229	548,590
2012	495,839	575,233	506,325	585,719
2013	527,270	611,696	538,420	622,847
2014	558,700	648,160	570,516	659,975
2015	590,131	684,624	602,611	697,104
2016	621,562	721,087	634,707	734,232
2017	652,993	757,551	666,803	771,360
2018	684,424	794,015	698,898	808,489
2019	715,855	830,478	730,994	845,617
2020	747,286	866,942	763,090	882,746
2021	778,717	903,406	795,185	919,874
2022	810,148	939,869	827,281	957,002
2023	841,579	976,333	859,376	994,131
2024	873,010	1,012,797	891,472	1,031,259
2025	904,440	1,049,260	923,568	1,068,387
2026	935,871	1,085,724	955,663	1,105,516
2027	967,302	1,122,187	987,759	1,142,644
Totals	12,602,511	14,620,436	12,869,030	14,886,954

TABLE C-7

TABLE A-11
LOWER AND UPPER ESTIMATES OF TOTAL TRAVEL TIME SAVED
TRUCKS
(person hours)
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	32,620	37,843	33,310	38,533
2011	34,988	40,590	35,728	41,330
2012	37,356	43,337	38,146	44,127
2013	39,724	46,085	40,564	46,925
2014	42,092	48,832	42,982	49,722
2015	44,460	51,579	45,400	52,519
2016	46,828	54,326	47,818	55,316
2017	49,196	57,073	50,236	58,114
2018	51,564	59,820	52,654	60,911
2019	53,932	62,567	55,072	63,708
2020	56,300	65,315	57,490	66,505
2021	58,668	68,062	59,908	69,302
2022	61,036	70,809	62,327	72,100
2023	63,404	73,556	64,745	74,897
2024	65,772	76,303	67,163	77,694
2025	68,140	79,050	69,581	80,491
2026	70,508	81,797	71,999	83,288
2027	72,876	84,545	74,417	86,086
Totals	949,461	1,101,489	969,540	1,121,569

TABLE C-8

TABLE A-12
ESTIMATES OF THE VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
AUTOMOBILES
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$15,218,286	$18,175,361	$15,540,123	$18,506,683
2011	16,323,020	19,494,758	16,668,220	19,850,131
2012	17,427,755	20,814,154	17,796,318	21,193,579
2013	18,532,490	22,133,551	18,924,416	22,537,027
2014	19,637,225	23,452,948	20,052,514	23,880,475
2015	20,741,960	24,772,344	21,180,611	25,223,923
2016	21,846,695	26,091,741	22,308,709	26,567,371
2017	22,951,429	27,411,137	23,436,807	27,910,819
2018	24,056,164	28,730,534	24,564,905	29,254,268
2019	25,160,899	30,049,930	25,693,003	30,597,716
2020	26,265,634	31,369,327	26,821,100	31,941,164
2021	27,370,369	32,688,724	27,949,198	33,284,612
2022	28,475,103	34,008,120	29,077,296	34,628,060
2023	29,579,838	35,327,517	30,205,394	35,971,508
2024	30,684,573	36,646,913	31,333,492	37,314,956
2025	31,789,308	37,966,310	32,461,589	38,658,404
2026	32,894,043	39,285,707	33,589,687	40,001,852
2027	33,998,777	40,605,103	34,717,785	41,345,300
Totals	$442,953,569	$529,024,179	$452,321,167	$538,667,849

TABLE C-9

TABLE A-13
LOWER AND UPPER ESTIMATES OF THE VALUE OF TRAVEL TIME SAVED
TRUCKS
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lower Estimate	Upper Estimate	Lower Estimate	Upper Estimate
2010	$590,423	$684,962	$602,909	$697,448
2011	633,283	734,685	646,676	748,078
2012	676,144	784,408	690,443	798,707
2013	719,004	834,131	734,209	849,337
2014	761,864	883,855	777,976	899,966
2015	804,725	933,578	821,743	950,596
2016	847,585	983,301	865,510	1,001,226
2017	890,445	1,033,024	909,276	1,051,855
2018	933,306	1,082,747	953,043	1,102,485
2019	976,166	1,132,470	996,810	1,153,114
2020	1,019,026	1,182,194	1,040,577	1,203,744
2021	1,061,887	1,231,917	1,084,343	1,254,374
2022	1,104,747	1,281,640	1,128,110	1,305,003
2023	1,147,607	1,331,363	1,171,877	1,355,633
2024	1,190,468	1,381,086	1,215,644	1,406,262
2025	1,233,328	1,430,809	1,259,410	1,456,892
2026	1,276,188	1,480,533	1,303,177	1,507,521
2027	1,319,049	1,530,256	1,346,944	1,558,151
Totals	$17,185,243	$19,936,958	$17,548,677	$20,300,392

TABLE C-10

TABLE A-14
ESTIMATES OF VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
TOTAL
TOLL OPTION

Year	Corridor 5-4		Corridor 4-4A	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$15,808,709	$18,860,323	$16,143,032	$19,204,131
2011	16,956,304	20,229,443	17,314,896	20,598,209
2012	18,103,899	21,598,563	18,486,761	21,992,286
2013	19,251,494	22,967,682	19,658,625	23,386,364
2014	20,399,089	24,336,802	20,830,490	24,780,442
2015	21,546,684	25,705,922	22,002,354	26,174,519
2016	22,694,279	27,075,042	23,174,219	27,568,597
2017	23,841,875	28,444,161	24,346,083	28,962,675
2018	24,989,470	29,813,281	25,517,948	30,356,752
2019	26,137,065	31,182,401	26,689,812	31,750,830
2020	27,284,660	32,551,521	27,861,677	33,144,908
2021	28,432,255	33,920,640	29,033,542	34,538,985
2022	29,579,850	35,289,760	30,205,406	35,933,063
2023	30,727,445	36,658,880	31,377,271	37,327,141
2024	31,875,041	38,028,000	32,549,135	38,721,218
2025	33,022,636	39,397,119	33,721,000	40,115,296
2026	34,170,231	40,766,239	34,892,864	41,509,374
2027	35,317,826	42,135,359	36,064,729	42,903,451
Totals	$460,138,811	$548,961,137	$469,869,844	$558,968,241

TABLE C-11

TABLE A-15
ESTIMATES OF PRESENT VALUE OF TRAVEL TIME SAVED
BASED ON LOWEST TIME SAVINGS AND LOWEST BUSINESS TRAVEL
IN CONTRAST TO
HIGHEST TIME SAVINGS AND HIGHEST BUSINESS TRAVEL
TOTAL
TOLL OPTION

Year	Corridor 5-4A		Corridor 4-4A	
	Lowest Estimate	Highest Estimate	Lowest Estimate	Highest Estimate
2010	$12,475,362	$14,883,529	$12,739,192	$15,154,843
2011	$12,505,590	$14,919,591	$12,770,059	$15,191,563
2012	$12,478,470	$14,887,236	$12,742,365	$15,158,618
2013	$12,401,376	$14,795,261	$12,663,641	$15,064,966
2014	$12,280,964	$14,651,604	$12,540,682	$14,918,691
2015	$12,123,230	$14,463,422	$12,379,612	$14,727,079
2016	$11,933,573	$14,237,156	$12,185,945	$14,496,688
2017	$11,716,846	$13,978,593	$11,964,635	$14,233,411
2018	$11,477,402	$13,692,928	$11,720,127	$13,942,539
2019	$11,219,141	$13,384,814	$11,456,403	$13,628,808
2020	$10,945,549	$13,058,409	$11,177,026	$13,296,453
2021	$10,659,738	$12,717,427	$10,885,171	$12,949,255
2022	$10,364,478	$12,365,172	$10,583,666	$12,590,578
2023	$10,062,227	$12,004,577	$10,275,024	$12,223,410
2024	$9,755,165	$11,638,242	$9,961,468	$11,850,397
2025	$9,445,215	$11,268,460	$9,644,963	$11,473,875
2026	$9,134,068	$10,897,252	$9,327,236	$11,095,900
2027	$8,823,208	$10,526,385	$9,009,802	$10,718,272
Totals	$199,801,603	$238,370,058	$204,027,015	$242,715,346

APPENDIX D

SENSITIVITY OF ESTIMATES TO SAMPLING ERROR AND ASSUMPTIONS

SENSITIVITY OF ESTIMATES TO SAMPLING ERROR AND ASSUMPTIONS

When seeking to measure the economic impact of a project, it is frequently necessary to rely upon samples and assumptions with respect to some of the variables that drive the impacts. Within the material included in this Appendix, the sensitivity of the quantified economic impacts to variations in the values of the factors that are derived from samples and assumptions is examined for each of the corridors.

Loss of Tax Revenue to Governmental Units

The value of the property necessary to accommodate the access road, and consequently the losses in tax revenue to various governmental units, is sensitive the location of the alternative corridors, their respective lengths, the width of the needed right-of-way, and the stage of development of the property at the time of acquisition. The two alternatives (5-4A and 4-4A) differ in length by only 0.15 miles and the characteristics of their locations are similar. Thus, the losses in tax revenues associated with the two differ by less than $12,500 per year, or approximately $242,000 through the year 2027.

In calculating the tax revenues lost to governmental units utilized in the report, it was assumed that a right-of-way width of 300 feet would be utilized and the proportion of each parcel of property that would be necessary to accommodate the right-of-way for each alternative was estimated on that basis. However, 1) the estimated 300 foot right-of-way acreage used in computing the quantified economic impacts for this report is somewhat higher than the acreage derived mathematically by CH2MHill, 2) the access road may ultimately be

constructed using a 150 foot right-of-way, and 3) as noted in the body of this report, the lost revenue calculations assume that two subdivisions will be fully developed at the time the needed land is acquired. Given the above three conditions, it seems reasonable to believe that the tax revenues lost to governmental units could be somewhat less than those derived as economic impacts. In any case, given the existing planning assumptions the losses in tax revenue are in the range of 7.8 to 8.7% of the total quantified positive economic impacts for the non-toll option so that it would require a large increase in this factor to have a noteworthy impact on the rate of return on this project. The same is true for the toll option since the losses are in the range of 8.9 to 9.9% of the quantified positive economic impacts.

Traffic Volumes

When evaluating the sensitivity of the economic impacts to changes in traffic volumes measured in terms of average annual daily traffic (AADT), it appears reasonable to do so on the basis of some amount of change in the mean of the average annual daily volume (AADT) over the period for which impacts are being calculated. Given that approach, the sensitivity of the economic impacts expressed in the following sections are based, where appropriate, on changes in AADT of 100 vehicles. With respect to the non-toll AADT, a change of 100 in the average AADT for the 2010 through 2027 period is equivalent to the following changes: Corridors 5-4A and 4-4A---0.78%.[1] A change of 100 in the 2010 to 2027 average AADT for the toll option will produce the following changes: Corridors 5-4A and 4-4A—0.92%

In computing the economic impact quantities within the text of the report, it was assumed that the traffic utilizing the proposed access road would travel to

[1] Wherever the changes are expressed as percentages, those percentages are variations from the expected, or central, values.

and from the south from the point where the access road interchanges with I-540. Given that assumption, it was also assumed that those electing to use the access road would have traveled on SH 264. It is possible that the automobiles and trucks using the access road would have traveled on SH 112 and/or had an origin or destination point north of XNA. While all the economic impact values that are some function of traffic volume would be altered if the original assumptions prove to be in error, it is believed that the probability of a meaningful change is small.

Traffic Diversion and Impact on Businesses

The impact of traffic diversion on businesses is small relative to the total quantified economic impacts. With the non-toll option, it is estimated the lost pre-tax gross profit associated with traffic diversion is 1.15% and 1.09% of the total quantified positive economic impacts for Corridors 5-4A and 4-4A, respectively. For the toll option, lost pre-tax gross profit as a result of traffic diversion is estimated to be 1.28% for Corridor 5-4A and for Corridor 4-4A, 1.21%.

A change of 100 in the AADT would produce a change of approximately $48,500 in the diverted sales of firms that might be impacted by the access road between 2010 and 2027 regardless of the corridor selected and whether or not it is a non-toll or toll road. The present value of the change in sales would be approximately $21,000. The change in gross profit of the impacted firms would be approximately $10,900, with a present value of about $4,700[2]. When compared to the quantified economic impacts, a change in AADT of 100 vehicles would change the total quantified economic impacts by less than 0.01% for either the non-toll or toll options.

[2] The totals of the present values of the non-toll and toll options are slightly different. For diverted sales their difference is about $100, and for gross profit, the difference is approximately $50.

It is possible that there is error in measuring the impact per diverted vehicle. However, given the small size of this economic impact relative to the totals of the quantified economic impacts, it appears that even if the impact per diverted vehicle is appreciably larger than that found in the study, the change in the total quantified economic impacts of any one of the corridors would be negligible.

Crash-Related Benefits

Crash-related economic impacts are a function of frequency, severity, traffic volume and the amounts individuals are willing to pay to avoid crashes. However, they are the smallest of the three positive computed economic impacts. For both the non-toll and toll options, the impact for Corridor 5-4A is 7.4% and for Corridor 4-4A, 7.3%.

For every 100 vehicle change in the volume of traffic, the total crash-related benefits over the period 2010 to 2027 will change by the following amounts: Corridor 5-4A – $422,000, and Corridor 4-4A -- $424,000. The present values of the amounts of change are as follows: Corridor 5-4A -- $184,000 and Corridor 4-4A -- $185,000.

The frequencies of crashes per million miles of travel used in determining crash-related benefits are those derived by the Arkansas Highway and Transportation Department for rural, four-lane, controlled access and rural, two-lane highways. Neither of these is specific to I-540, SH 264 or the proposed XNA access road. However, an analysis done by CH2MHill suggests that the accident rate on SH 264 is higher than the average for all rural, two-lane highways in Arkansas. Additionally, since the construction of the proposed XNA access road will diminish the density of traffic over portions of I-540 and SH 264 and the access road itself will be two-lane, controlled access, it seems

reasonable to assume that construction of the access road will diminish the frequency of accidents on I-540 and SH 264 and may result in a new roadway that has a crash frequency less than the average for rural, four-lane controlled access roads in Arkansas. This suggests that crash-related benefits may be greater than those estimated in this report rather than less than.

The severity of crashes is based on the actual three-year experience for SH 264 and that portion of I-540 in the vicinity of the points where it would intersect with the proposed accessed road. There is variation in the severity of crashes from year-to-year and there can be no assurance that the severity of crashes will remain the same over the period from 2010 to 2027. However, the use of a three-year average in the calculations is designed to minimize the estimating error over the sixteen-year estimation period.

It seems reasonable to believe that any change in the dollar values of the willingness to pay to avoid crashes of varying severity would be an upward adjustment. If that is correct, the positive economic benefit derived from the construction of the access road would increase. However, it would most likely continue to be the smallest of the three quantified positive impacts.

Value of Saved Travel Time

The value of saved travel time for Corridor 5-4A is 82% of its positive economic impacts; and for Corridor 4-4A, the number is 81%. Thus, this is the most important factor in determining the net economic benefits of each of the alternative corridors.

The estimates of the value of saved travel time are sensitive to both variations in the volume of vehicles utilizing the access road, the mix (automobiles vs. trucks) of the vehicles using the road, sampling error associated

with estimating the mean travel times for the present route to the Northwest Arkansas Regional Airport, the estimated time required to travel the new route, the number of passengers per vehicle, the sampling error associated with estimating the proportion of travel that is business versus personal, and the dollar values of time..

With respect to variations in the volume of vehicle traffic, and as noted earlier, for every 100 change in the AADT the value of saved travel time, given the non-toll option, will change 0.78% for Corridors 5-4A and 4-4A. With the toll option, the change will be 0.92%. In nominal dollar terms, the changes, given either option, will be as follows: Corridor 5-4A -- $4.6 million and Corridor 4-4A -- $4.7 million.

The hourly rates of (values of time) utilized for business and personal travel, as well as those of truck drivers, are those recommended by the U.S. Department of Transportation. Any given percentage change in those numbers will result in a like percentage change in the values associated with travel time. Given the relative importance of time-savings in the determination of net economic benefits of the access road, the hourly rates would appear to be one of the more critical factors in determining the net economic benefits.

Non-Toll Option

The sensitivity of the estimated value of travel time-savings to sampling errors in travel time and the proportion of travel that is for business purposes is presented in three tables in Appendix A (A-12, A-13 and A-14). Table A-14 contains estimates that combine those for automobiles[3] and trucks.[4] As

[3] The estimates for automobile travel shown in Table A-11 were developed using the lower and upper limits of the 95% confidence interval estimates for both saved travel time and the proportion of automobile travelers that are classified as engaging in business travel in order to calculate the lowest and highest estimate.

reflected in that table, when sampling error for both travel time and the proportion of travel that is for business purposes is taken into consideration, the estimate of the value of total travel time saved for Corridor 5-4A is between $537.7 million and $641.5 million and that for Corridor 4-4A is between $549.1 million and $653.2 million.

The present values of the lowest and highest values of saved travel time are provided in Table A-15 in Appendix A. Corridor 5-4A has a present value range of from $235.0 million to $280.4 million and the comparable numbers for Corridor 4-4A are $240.0 million and $285.5 million.

In estimating the amounts and values of saved travel time, it was assumed that the average speed on each of the alternative corridors for the access road is 65 mph. A change of one (1) mph will result in approximately a 1.8% change in the value of time saved (both in nominal and present value terms). For each one (1) mph change in average speed, the nominal dollar change for Corridor 5-4A's change is $9.5 million (lowest) to $11.4 million (highest); and that for Corridor 4-4A is $10.0 million (lowest) to $11.9 million (highest).

In computing the economic impact of the access road, the mix of vehicle traffic is assumed to be 88% automobiles and 12% trucks. If the mixture changes by 1.0% to 89% automobiles, the estimates of the values of travel time saved will increase by 0.8%. The nominal dollar increase in the lowest and highest estimates (Table A-18) will increase by $4.2 million (lowest) and $5.1 million (highest) for Corridor 5-4A, and that of Corridor 4-4A will increase by $4.3 million and $5.2 million.

In estimating the value of time, it was assumed that each automobile had 1.86 occupants. For a 0.1 change in the number of occupants, the value of saved time will change 5.18% over the evaluation period. The changes, in

[4] The lower and upper estimates for trucks are the bounds based upon variations in the mean travel times and are 95% confidence interval estimates.

nominal dollar terms, are as follows: Corridor 5-4A--$27.8 million (lowest) and $33.2 million (highest) and Corridor 4-4A--$28.4 million (lowest) and $33.8 million (highest).

With a $1.00 increase (decrease) in the hourly rates of pay for business and personal travel, as well as truck drivers, the lower and upper estimates of the value of saved time will increase (decrease) by 3.0% and 2.9%, respectively. For Corridor 5-4A the lowest estimate will increase (decrease) $16.2 million and the highest, $18.8 million. The changes for Corridor 4-4A will be $16.6 million and $19.2 million, respectively.

Toll Option

Appendix C contains three tables (C-8, C-9 and C-10) that display the sensitivity of the estimated value of travel time-savings to sampling errors in travel time and the proportion of travel that is for business purposes for the toll option. Table C-10 contains estimates that combine those for automobiles[5] and trucks.[6] As reflected in that table, the total value of time saved associated with Corridor 5-4A is between $460.1 million and $549.0 million and that for Corridor 4-4A is between $469.9 million and $558.0 million.

The present values of the lowest and highest values of saved travel times are provided in Table C-11 in the Appendix C. Corridor 5-4A has a present value range of from $199.8 million to $238.4 million and the comparable numbers for Corridor 4-4A are $204.0 million and $242.7 million.

It was assumed that the average speed on each of the alternative corridors for the access road is 65 mph when estimating the amounts and values

[5] The estimates for automobile travel shown in Table C-12 were developed using the same methodology applied in Table A-14.
[6] The estimates for trucks in Table C-13 were developed in a manner identical to that used for Table A-15.

of saved travel time. A one (1) mph change in average speed will result in approximately a 1.8% change in the value of time saved (both in nominal and present value terms) for Corridor 5-4A, and Corridor 4-4A. With a (1) mph change in average speed, the nominal dollar change for Corridor 5-4A changes by $8.4 million and $10.0 million for its lowest and highest values; and that for Corridor 4-4A is $8.3 million and $9.9 million.

If the mix of automobiles and trucks is altered by 1%, the lowest and highest estimates of the value of travel time saved (see Tables C-14 and C-15) will change by 0.78% and 0.79%, respectively. As a result of each 1% increase in the proportion of the vehicle mix that is automobiles, the increases for Corridor 5-4A will be $3.6 million (lowest estimate) and $4.4 million (highest estimate); while those for Corridor 4-4A will be $3.7 million and $4.4 million.

Given a $1 change in the values assigned to the time for business, personal and truck travel, the lowest and highest estimates of the value of travel time saved with change by 3.02% and 2.94%, respectively. Corridor 5-4A's changes will be $13.9 million (lowest estimate) and $16.1 million (highest estimate). The lowest estimate for Corridor 4-4A will change $14.2 million and the highest will change $16.4 million.

If one changes the number of passengers per automobile from 1.86 (the number used to quantify economic impacts in the report) to 1.76 (a change of 0.1 passengers per vehicle), the lowest and highest estimates of the value of travel time saved will change by 5.18%. In nominal dollar terms, Corridor 5-4A's changes will be $23.8 million and $28.4 million and those for Corridor 4-4A will be $24.3 million and $29.0 million.

Vehicle Operating Costs

The vehicle operating cost savings for the proposed access road are a function of the change in travel distance, the volume of traffic, the proportion of that traffic that is automobiles versus trucks, and the average per mile operating costs of each type of vehicle.

Non-Toll Option

For each 100 vehicle change in traffic volume (AADT) between 2010 and 2027, the operating cost savings will change as follows: Corridor 5-4A--$0.62 million and Corridor 4-4A -- $0.66 million.

If the mix of automobiles and trucks changes by 1%, the computed operating cost savings will change by 5.6% from the expected values. In nominal dollar terms, the changes will be: Corridor 5-4A -- $4.4 million and Corridor 4-4A -- $4.7 million.

Given that the operating costs of both types of vehicles change by 1%, the changes in the operating cost savings will be as follows: Corridors 5-4A -- $0.79 million and Corridor 4-4A -- $0.85 million.

Toll Option

For each 100 vehicle change in traffic volume (AADT) between 2010 and 2027, the operating cost savings will change as follows: Corridor 5-4A -- $0.62 million and Corridor 4-4A -- $0.66 million.

A change of 1% in the vehicle mix (automobiles vs. trucks), will result in the following changes in: Corridor 5-4A -- $3.82 million and Corridor 4-4A -- $4.0

million. As with the non-toll operating savings impact, these changes are 5.6% of the expected values.

For each 1% change in the operating costs of both types of vehicles, the changes in the operating cost savings will be as follows: Corridors 5-4A--$0.68 million and Corridor 4-4A -- $0.72 million.

Total Quantified Economic Impacts

There are five components of the total quantified economic impacts and the relative significant of each component for each option (non-toll and toll) is set forth in the material that follows in this section.

Non-Toll Option

Corridor 5-4A—This alternative has the smallest total quantified positive economic impact at $721.8 million and also the largest negative economic impact. The latter is approximately $8.3 million, or 1.15% of the positive impacts. Approximately 82% of the positive impacts are associated with time savings, almost 11% is derived from operating cost savings and 7% is from crash reduction. Traffic diversion accounts for 17% of the negative impacts and reductions in government tax revenues are 83% of total negative impacts.

Corridor 4-4A--The selection of this corridor results in $739.3 million in positive quantified economic impacts and $8.0 million in negative quantified economic impacts. The negative impacts are equivalent to 1.09% of the positive ones. Time savings produces over 81% of the positive impacts, while operating cost savings provides 11.5% and crash reduction 7%.[7] Losses in government

[7] Some of the percentages do not add to 100 due to rounding.

tax revenues account for 83% of the negative economic impacts and traffic diversion the remainder (17%).

Toll Option

Corridor 5-4A—This alternative has the smallest quantified positive economic impact at $617.6 million and also the largest negative economic impact. The latter is approximately $7.9 million, or 1.28% of the positive impacts. Almost 82% of the positive impacts are associated with time savings, 11% is derived from operating cost savings and 7% is from crash reduction. Traffic diversion accounts for 15% of the negative impacts and reductions in government tax revenues are 85% of total negative impacts.

Corridor 4-4A-- The selection of this corridor results in $632.6 million in positive quantified economic impacts and $7.7 million in negative quantified economic impacts. The negative impacts are equivalent to 1.21% of the positive ones. Time savings produces 81% of the positive impacts, while operating cost savings provides 11.5% and crash reduction 7%. Losses in government tax revenues account for 84.5% of the negative economic impacts and traffic diversion has a 15.5% share of the negative impacts.